

The Iron Age

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The Fayette Brown Blast Furnace Hoist.

We take pleasure in presenting in this issue engravings of an automatic furnace hoist, designed by Mr. Fayette Brown, of the Brown Hoisting and Conveying Machine Company, of Cleveland, Ohio, and built for the Riverside Iron Works, at Steubenville, Ohio.

The general features of the hoist are well shown in the illustration on this page. Details are given on page 19. The hoist consists, in the main, of an inclined bridge starting from a pit in the stockhouse and reaching to the top of the shell of the furnace at L, Fig. 2, to which it is secured by abutment lugs and pins. From this point continues an extension of the frame over the top of the bell and hopper. On the top chords of this bridge are secured cross-ties, upon which is a track of T-rails extending from the skip pit to the point L of the bridge where it is bent in toward the hopper as shown at R. A second rail, R', outside the main track, extends a portion of the way up to the top frame. A skip car S, is arranged to run on the track, the hoist rope passing over the top sheave O, back to the drum of the hoisting engine near the foot of the incline. This engine is so arranged as to hoist the load to the proper height, and automatically prevent overwinding by means of a special safety throttle-valve designed for the purpose. The skip car is constructed with one set of narrow tread-wheels in front and a set of double the width in the rear. The hoist rope bail y is pivoted as shown. When the skip car arrives at the top of the furnace L, the front wheels continue on the bent portion of the track R, passing between the rails R', the broad tread of the hind wheels reach the outer rails R' and continue up to the proper height for tipping the car and dumping the load. The outline sketch of the car S, Fig. 3, shows a screw, x, by means of which the hind wheels are adjusted by a movement forward or back to the exact position that secures the best result in dumping. The gas sealing doors D are connected by means of levers and connecting arms to the shaft of the chain wheels G, which are, in turn, operated by means of rope connection to the pilot wheel W situated near the engine; by means of this the engineer may readily open and close the doors. These latter are left open when the bell is up and the hopper is closed, that the bell and hopper may not become overheated. This would occur if a free circulation of air were prevented. The doors are closed only when the bell is ready to lower its charge into the furnace, thus preventing the escape of gases when the furnace top is open. The bell is operated by the ordinary lever B and air cylinder C, as shown. A four-way valve of special design is located on a convenient stand in the engine-room, and connected to the air cylinder and drum by pipe connections, so that all the manipulations of charging the stock by means of the bell are readily performed by the engineer at his post.

Near the operator, and in plain view of him, and of the bottom fillers and manager, is a large dial with a pointer, or indicator, which, every time the bell is lowered, shows the exact height of the stock in the furnace. This can also be registered automatically on paper by an attachment under lock from the operator, which gives the record of stock line at all times, and also enables the manager to ascertain the uniformity of charging during his absence. The dial of the register is of such size that for 1-inch motion of the bell there is a 3-inch motion of the pointer on the dial. Any distribution of stock desired can be had by the simple adjustment of the car in reference to dumping on the apex of the bell.

There is also a register that indicates the number of skip cars charged into the hopper before the lowering of the bell, thus preventing over or under filling of the bell before it is lowered. All danger of over-hoisting is avoided by a safety stop, so constructed that when the drum has made the requisite number of revolutions to effect the desired hoist, the steam supply valve is automatically closed so that the elevating car is stopped at the exact locality designated, and cannot go beyond, as the cutting off of the steam stops the engine. The skip car descends into a pit at the lower end of the bridge so that its front, or open end, is on a level with the stock house floor. The bottom filling is therefore so much easier than when empty barrows have to be removed before full ones can be put upon the ordinary hoisting cage, that the labor of one or two men each 24 hours is, in some cases, saved in the bottom filling.

Fig. 4 represents an end view with the air cylinder C and the lever B removed, showing the chain wheels G G, and the levers for opening and closing the doors D.

The clear span of the bridge at the Riverside Iron Works is 87 feet, and the lower extension into the stock house measures 31 feet; the extension frame above the furnace platform is 28 feet 6 inches long. The height of the stack is 76 feet; diameter of shell at top, 18 feet; capacity of steel skip car, 75 cubic feet. The stock house floor is 10 feet below the base of the furnace. The hoisting engine is of the double cylinder type, 10 inches x 15 inches, with a band-friction hoisting drum, 4 feet in diameter. A hoist of the same general design was

first put into operation about four years ago at the Stewart Furnaces, Sharon, Pa.; afterward for the two stacks of the Lucy Furnaces, at Pittsburgh, and one stack of the Ohio Iron Company, at Zanesville, Ohio. At all these places it has given great satisfaction.

A Curiosity in Photometry.

It is interesting at the present day, when the photometry of gas and electric lights has been brought to some degree of perfection, to read of an expedient adopted in former times in Paris to control the quality of the street lamps. The method has very recently been made public. The Police Department of Paris, in whose charge the matter was placed, had paper patterns cut out representing what they considered the

The New Swedish Explosive.

Bellit is a new explosive which has been discovered by Mr. Carl Lamm, managing director of the Rönneby Explosive Manufactory, Limited, close to Stockholm. It consists of nitrate of ammonium and denitrobenzol, which, when in a melted condition (the melting point is 80° to 90° C.), are mixed with saltpeter, forming a compound of which each molecule explodes. Bellit, when pressed warm, has a specific weight of 1.2 to 1.4 in its granulated state, which, according to the experiments already made, seems to be the one best suited for military purposes. One liter of bellit weighs 800 to 875 grams. Heated in an open vessel bellit loses its consistency at 90° C., but does not commence to separate before a temperature of 200° C. is reached; at that point evaporation begins

was no explosion. A good sized piece of bellit was placed in an open tin box and covered with gun-powder; the latter was ignited, the explosion throwing the bellit several yards in the air, but it did not explode. In a piece of hardwood a hole was made of the size of a penholder; 2 grains of bellit were pressed hard into the hole and this closed with a wooden cork. The wood was thrown into a coke fire and consumed, but there was no explosion. A compressed bellit cartridge was placed close to a rocky wall and some 3 inches from it a cartridge of nitrolic (nitro-glycerine, gun cotton and nitrate of ammonium); the latter charge was made to explode by a Stabine percussion cap, and after the explosion the bellit cartridge was found to have been crushed, and the powder into which it was turned was affixed to the rock.

Disappearing Guns and Turrets.

From a series of interesting articles on "Science and Gunnery," published in *Nature* a short time ago, we extract the appended particulars relative to disappearing gun carriages. The subject is one which has already attracted a good deal of attention, disappearing guns having been successfully put to practical use in the past. Hence the propriety of its further consideration. We quote:

The public has been much interested of late in the beautiful mechanism by means of which Mr. Maxim has utilized the energy of recoil, not only to run out the barrel of his gun at every shot, but also to perform all the operations of loading and firing automatically, and that at a rate which almost baffles the imagination. Six hundred shots per minute can be fired without any external power being used. The energy imparted to the shot must have its counterpart in the movement of the gun and carriage in the opposite direction, and Colonel Moncrieff, 20 years ago, showed how, by suitable mechanical arrangements, guns of all sizes could be made to recoil under cover and be raised again into the firing position without the application of external force. There are two systems by which this is accomplished, by means of counterweights and by means of metallic air springs. In the former case it is easy to see how the counterweight can be so arranged that the work represented by the falling of the gun may be exactly balanced by the work of lifting the balance weight; the energy of recoil, therefore, need only be drawn upon to overcome the friction of the descent and the subsequent friction of ascent, together with the accelerating force necessary to start the gun into smart upward movement. The total amount of work expended in friction does not probably exceed 20 per cent. of the work of raising the gun, and consequently the old muzzle loaders, with their comparatively small charges and low muzzle velocities of projectile, yield ample power to allow the guns to be lowered completely beyond the reach of hostile shot.

This is a consideration of great importance, because year by year a large number of excellent muzzle-loading guns of all calibers will be returned into store from the Navy, and may at once be utilized for strengthening our coast defenses, for they are quite powerful enough to act against unarmored vessels, light draft transports, and such like, as well as against the unprotected parts of ironclads; while as howitzers they would be invaluable for preventing landing from boats, and for this service would be quite as effective as the longer, more costly, and more delicately made breech loaders, which, however, should be associated with them to resist ironclads. It so happens, also, that the short muzzle-loader is particularly well suited to the Moncrieff carriage, because the men engaged in loading, training, and elevating, working completely under the parapet, are in absolute safety from the enemy's fire, and the only man exposed is he who lays the gun, and even that exposure, as we have already remarked, can often be dispensed with. The muzzle-loaders are also much more simple weapons to manage than the modern, more powerful guns, and would, therefore, be better fitted for coast batteries, which would undoubtedly have to be manned and worked by volunteers and men not so highly trained as the artillery of the regular army.

Some years ago the War Office definitely adopted the Moncrieff counterweight carriage, and mounted successfully guns as large as the 9 inch of 12 tons weight, but after a time evil counsels prevailed, inveterate prejudice triumphed, and the nation has been saddled with a vast expenditure on forts, which are already obsolete, for by no sort of ingenuity can they be made to carry artillery fitted to cope with that which will be opposed to them. The counterweight system, however, becomes very cumbersome when guns exceed some 20 tons in weight. Recourse can then be had to compressed air as a means of storing the energy of recoil. But the work done in compressing air reveals itself in the form of heat, which raises its temperature, and is slowly dissipated as it cools. Again, the air, in expanding to raise the gun, is cooled by the amount of heat converted into work, and its pressure is thereby reduced, so that the losses on these two accounts, added to the somewhat increased friction of the machinery, set a limit to the height to which the stored energy of recoil can raise the gun; the increased charges used in modern artillery, however, compensate for these losses, and it is possible by hydro-pneumatic arrangement to give efficient cover to the heaviest guns. The natural fear arises lest the introduction of water and compressed air may not add elements of danger in the facility with which dirt and debris, not sufficient to injure an ordinary mounting, may affect the more complicated arrangement. There is no doubt that a breech-loading gun requires more care in its use than a muzzle-loader, and a hydro pneumatic mounting is not so simple as a carriage with an ordinary friction or hydraulic compressor, but experience with the 6 inch hydro-pneumatic siege carriage has shown that the system is capable of enduring very rough usage, and is by no means easily deranged.

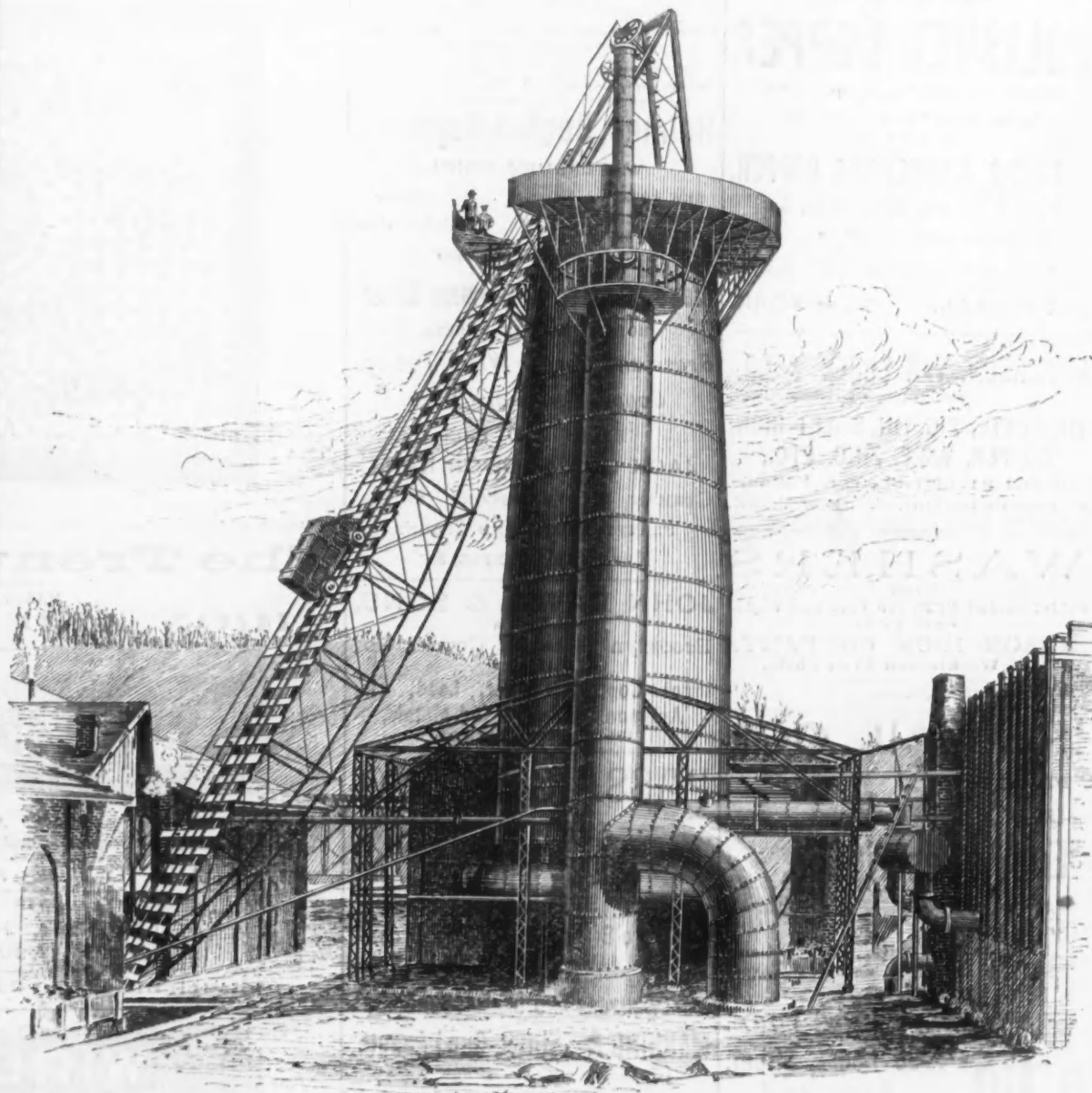


Fig. 1.—General View. (For details see page 19.)

FURNACE HOIST AT THE RIVERSIDE IRON WORKS, STEUBENVILLE, OHIO, BUILT BY THE BROWN HOISTING AND CONVEYING MACHINE COMPANY, CLEVELAND, OHIO.

proper size, or profile, of a gas flame. These were furnished to their inspectors, who compared them with the flames of the street burners, and judged accordingly of their quality. In case of deficiency, fines were imposed. These fines were levied, and not collected until some 600,000 francs stood against the gas company. The method was so crude that the authorities did not venture to submit it to a court of law. The devisers of the plan overlooked the fact that a small flame may, and often does, give more light than a large one, and reduced it all to a question of size. Nevertheless, our present system is far from perfect from analogous causes. Complaints of its inaccuracy have grown more frequent since the introduction of water gas, and several have appeared during the last year. It is known that a water gas that shows 16 candles on the bar photometer is far from satisfactory, while a 16-candle coal gas will always be accepted as of good quality. The whiteness of the water-gas flame probably introduces an error. This appears especially probable when we recollect that the standard of comparison is a candle having an extremely yellow flame. Polarization photometers have been little tried, and it is hardly known how efficiently they will act, but at this late day the absolute photometer has yet to be constructed. The effect of light on the human eye is the ultimate standard. This introduces a subjective element into the question with which it is very hard to cope.

and increases with a higher temperature without, however, explosion occurring. If the heating is sudden, bellit will burn with a sooty flame, something like tar, but if the source of the heat is removed, the bellit will cease burning and assume a caramel-like structure, the ingredients being the same as in its original state with the exception of a somewhat reduced proportion of saltpeter. The explosive appears to absorb little moisture from the air after it has been pressed; if this operation be performed in the hot state the subsequent increase of weight is only 2 per cent.

Subjected to the most powerful blow a man is capable of inflicting with a steel hammer upon an iron plate, bellit certainly becomes heated, but neither explodes nor ignites. Two grains of bellit in a blank copper cartridge (that of a Remington rifle) were placed on an iron plate and subjected to the fall of a weight of 290 pounds from a height of 17 feet 6 inches without exploding. Layers of bellit of .47 inch in thickness on wood or iron have been pierced with rifle balls fired at a distance of some 50 yards, without showing signs of explosion or ignition. While boring in cast iron with a steel drill, 1 grain of bellit has been placed in the hole, neither explosion nor ignition having resulted, although no sort of oil or other lubricator was used. A small quantity of bellit was affixed to the appointed end of a steel rod and the rod knocked so hard against quartz as to produce sparks, yet there

The bellit was consequently not exploded. The list of these experiments might be considerably increased, but sufficient has been said to prove that bellit can withstand blows, fire, friction and vibration without the slightest risk of explosion. It can be safely transported by rail and stored without any danger of spontaneous combustion. Granulated bellit is caused to fully explode by the aid of a small quantity of fulminating mercury, even if its cover only consists of thin tin. When pressed warm, especially when it is in the form of hard cakes, it requires a stronger impulse and a stronger cover, which must adhere to the bellit.

The Atlantic Coast Line announces that it, in connection with the Pennsylvania, is now having built for the New York and Jacksonville service a special vestibule train, consisting of baggage, smoking and library, dining and sleeping cars, which will be heated by steam and lighted by electricity. The time between the two cities is to be reduced to 18½ hours. Vestibules are becoming so popular that the road that is not provided with at least a sample train will soon be badly behind the times.

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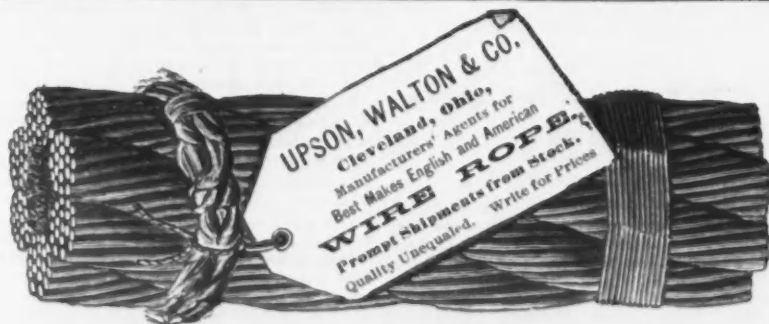
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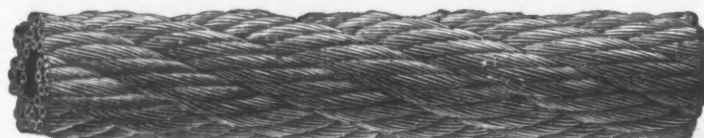
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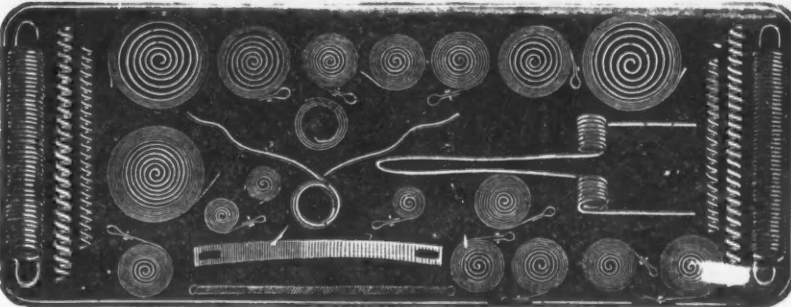
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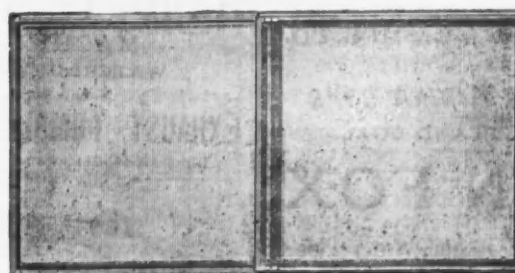
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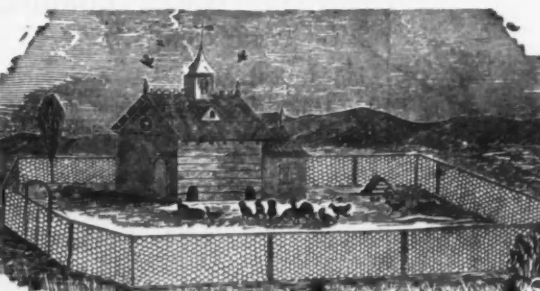
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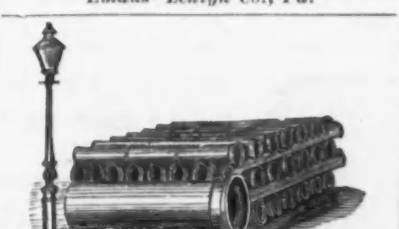
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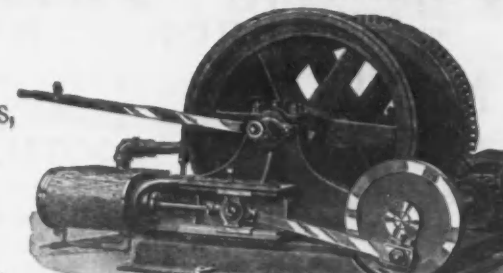
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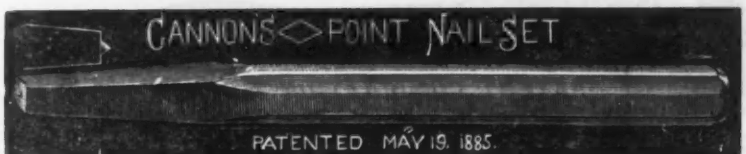
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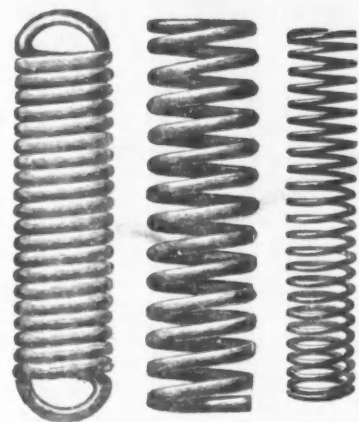
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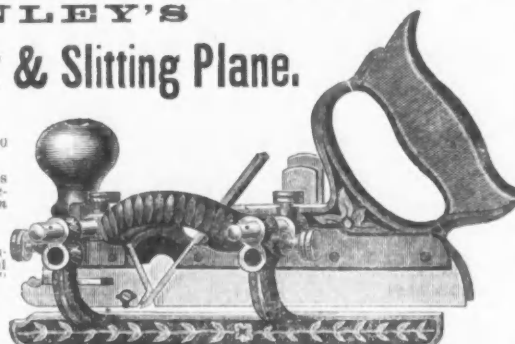
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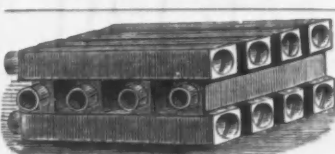
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In the course of a mission for the investi-
gation of iron structures M. Bricka noticed
very distinct differences in the methods of
construction of iron bridges erected within
the last 15 years in Central Europe, as com-
pared with those adopted in France. Of
these he writes, in an interesting manner in
the *Annales des Ponts et Chaussées*, an ab-
stract of his article being given in the ex-
cerpt minutes of the proceedings of the
British Institution of Civil Engineers. From
this we quote:

Germany.—Theoretical considerations have
mainly led to the difference in practice in
Germany. Parts which, according to cal-
culation, would be alternately subjected to
tension and compression are either discarded,
or are made very strong. Continuous gir-
ders are rarely adopted, as much on account
of the inevitable reversal of the strains as
on account of the very serious results which
would ensue from a slight settlement in the
piers. On the other hand, the limiting strain
is almost always made higher than 4½ tons
per square inch, and often more than 5 tons;
the parts are made to the exact theoretical
section, and the tension bars are generally
made flat, so that they could not be exposed
to compression; there is an evident tendency
to reduce the number of parts to a minimum,
and the wind ties are made very slight.
Various types, formerly employed, have been
abandoned; and now Schwedler girders hav-
ing a top hyperbolic flange connected to the
horizontal bottom flange by uprights and
diagonals, are largely adopted for spans of
from 65 to 200 feet. The strains are well
divided in this type; but the angles of the
upper flange, which is made straight be-
tween each upright, cause a difficulty in con-
struction, and are a source of weakness,
and the connections become awkward at the
extremities in large spans. Girders with
polygonal upper flanges, ended off square
at their extremities, similar to the Moerdyk
and Kuilenburg bridges, are extensively
adopted for large spans. These girders
possess the advantages of reducing the
weight of the flanges, owing to the increase
in depth toward the center, and of having
shorter uprights and diagonals at their ex-
tremities where these have to be strong,
than girders with parallel flanges. The cir-
cumscribing curve is a parabola, an ellipse
or a circle; and the central depth is be-
tween a sixth and seventh of the span.
Fish-bellied girders in which the horizontal
flange is at the top and the curved flange
below are not nearly so common as the pre-
vious types, owing to the reduction of the
headway below the rails, and difficulties in
erection. Girders with horizontal upper
and lower flanges connected by uprights and
ties are often adopted, with diagonals lim-
ited to single panels for spans of less than
165 feet, and extending across two panels
in larger spans. Fifteen bridges, constructed
within the last ten years after the above
types, are concisely described, and some of
them illustrated.

Holland.—Within the last 30 years the
type of bridge with uprights and diagonals
has been exclusively adopted for large iron
bridges in Holland. Girders with parallel
flanges are employed for spans up to 200
feet, and for the last 10 years the diagonals
have been limited to single panels, and the
end panels made triangular so as to have
pointed extremities. Larger spans have
been made with a parabolic or elliptical up-
per flange, and at the Rhenen bridge,
erected in 1883, the central upright exceeds
52 feet in height, and the diagonals are still
longer. The girders are never made con-
tinuous—a precaution dictated by the yield-
ing alluvial foundations throughout Hol-
land. The authorized strains for the main
girders are 3.8 tons on the square inch in
compression and 4.4 tons in tension, but in
the girders of the large spans (311 feet) of
the Rhenen bridge the maximum strain does
not exceed 3.3 tons, whereas in the earlier
bridges, such as the Kuilenburg bridge,
greater strains were allowed, which accounts
for the much greater weight per unit of
length of the bridges constructed within the
last five or six years. While simplifying
the parts, the low strains have been
adopted to insure durability, and with this
object, the speed of trains over bridges ex-
ceeding 100 feet in span, has been limited to
18½ miles an hour. After noting pecu-
liarities in the details of construction, a table
is given of the particulars of the large
bridges erected in Holland within the last 20
years; attention is directed to the different
systems adopted for the two superstructures
erected, on the same piers, over the Meuse
at Venloo in 1865 and 1885; and details are
given of the Rhenen bridge over the Rhine,
completed in 1883. The Dutch bridges re-
semble, in their general features, the most
common types employed in Germany, except
that in the larger spans the diagonals are
simple in each panel, which, though not
economical, has the important advantage, in
girders from 52 to 66 feet high, of reducing
the surface exposed to the wind, and enab-
ling the verticals to be made very rigid. In
the low strains admitted, and in the subor-
dination of economy of material to simplicity
of connection, they more resemble French
bridges.

Austria.—The types of bridges adopted
in Austria within recent years tend to ap-
proximate to those of Germany, but they are
for the most part simpler. The strains al-
lowed are 5.1 tons on the square inch in
tension and compression, and 3.8 tons for
shearing strains borne by rivets. Two exam-
ples are given of the types adopted by the
Society of State Railways from spans of 65
and 200 feet, which are both simple and
economical. The smaller bridge is very
similar to the Dutch bridges, with uprights
and ties and parallel flanges. The upper
flange is polygonal in the longer bridge,
being horizontal along the six central
panels, and the diagonals extend across two
panels. The bridges on the Arlberg Rail-
way, constructed by the Government engi-
neers, are more complicated. The two
largest bridges, forming portions of the via-
ducs of Trisana and Oetz, with spans of 394
and 266 feet, have parabolic upper flanges,
and uprights with diagonals of the second
order, or stretching across two panels.
Various objections have been raised against
the Trisana bridge, especially the position of

the roadway along the bottom of the girder
for a bridge 285 feet above the bottom of
the valley, when an arched bridge would
have looked better, and would probably have
cost less. Three bridges have been made
with fish-bellied girders, one, across the Inn,
having a span of 202 feet.

Switzerland.—One bridge of the St.
Gothard line has uprights with diagonals
of the second order, and parallel flanges;
its span is 184 feet. The other bridges have
trellis girders without uprights, and the
diagonal flat tie bars are not riveted to the
diagonal struts which they cross.

General Remarks.—It is difficult to insti-
tute a comparison, based upon the weight per
unit of length, for bridges erected in dif-
ferent countries, where the limit of strain
both differs and is not the same in the
various parts of the bridges, and where the
weight may vary considerably, according as
the simplicity of the connections, theoretical
considerations, or the lightness of the ac-
cessory portions are mainly considered. It
appears, however, that the different types of
girders constructed in France and other
countries, when applied to similar condi-
tions, have not led to the use of very differ-
ent amounts of material. The adoption of
a polygonal upper flange for girders of large
span enables a great economy to be effected
in the weight, by reducing the length of the
portions connecting the flanges where they
have to be strongest; and they are not more
unsightly than straight girders, when the
span is large enough for the angles between
the successive parts of the polygon not to be
apparent to the eye. As regards the distri-
bution of material, the numerous examples
of bridges with uprights and ties, and the
preference shown for them in Germany and
Holland for more than 20 years, demonstrate
that a perfect connection of the flanges
not entering into the calculations, and with-
out making all the parts rigid indiscrimi-
nately. The arrangements adopted for re-
ducing the weight of metal employed to a
minimum generally involve complications
not compensated by the economy realized,
as shown by a comparison of the Schwedler
girders, for average spans, with girders
having parallel flanges.

Eastern Workmen.

Speaking of Chinese sawyers and the ap-
parently inadequate character of their tools,
a correspondent of the *English Mechanic*
says:

At Deli, Sumatra, where Chinese labor
and a lucky accident of soil has created for
the Dutch those tobacco plantations whose
astounding profits are the envy of the Far
East, sawmills do not exist, and planks must
be had. To import them from the Straits
Settlements, and cart them at a fearful ex-
pense through miles of mud, is not to be
thought of, so a gang of Malays or Bataks
are hired and proceed to fell the required
timber by weeks of laborious hacking.
When they have finished, arrives the Chi-
nese "tukang pappan," or plank cutter, with
seven or eight brawny Chinamen in cotton
jackets and trousers and gigantic rattan hats.
They proceed to where the "merban" or
"mivanti" lies like a fallen lighthouse, and
cross cut the log into lengths of 12 feet or so,
using a European saw, which, when, as
is often the case, the trunk is 6 feet
thick where they commence, 30 feet from
the butt, has to be lengthened by strips of
iron neatly riveted on, and worked by four
men aside. This done, the Chinese tools
come into play. First, the workman mounts
the section of log with the axe, and swing-
ing it right and left, pendulum fashion, the
long handle projecting over his shoulder,
chops out a deep notch at intervals of 2 feet;
then beginning again, splits off the wood
between the notches until he completes one
side of the square. The log is then rolled
over, and the other sides squared with sur-
prising exactness in the same way. Then a
young tree is cut for a lever, and all hands,
with as many additional coolies as required,
raise the end of the log, packing up as it
rises until it is elevated at an angle of 45°
on a pile of split stuff. Lines are marked
out with a wet string and charcoal for as
many planks as the log will give, and then
the sawyer mounts the inclined surface and,
single handed, saws from daylight to dark,
under rain or sun, with scarcely a pause.
The saw varies in length, but is about 3
inches width, with very little "set." The
blade is shifted along the handles as the
work proceeds until the center is reached,
when it is reversed and moved back as it
again approaches the side. When all the
lines have been cut as far as possible, the
other end of the log is elevated and sawn in
the same way till the cuts meet, which they
generally do to a hair's breadth. The in-
strument, however, makes wild work in
English hands.

An interesting series of experiments has
been made by Mr. Martens, of Berlin, on the
physical properties of metallic magnesium.
Until now this metal has been too expensive,
costing about \$200 a pound, but under the
patent of Gratzel it is produced at figures
which are stated to be 40 to 50 marks for
wire and for strips, and the manufacturers
hope to be able to bring down the cost of
the crude magnesium to 20 marks per kilo-
gramme. At that price it is close upon
German silver, over which it possesses
important points of advantage. The metal
is now being made on a large scale and has
been used chiefly of late in producing what
are called lightning photographs. A mixture
of magnesium, powder, nitric acid, potash,
other substances yielding oxygen, is placed
before the apparatus in such a way that in
the dark the flashing of the mixture illumina-
tes objects for a short time, during which
the photograph may be taken.

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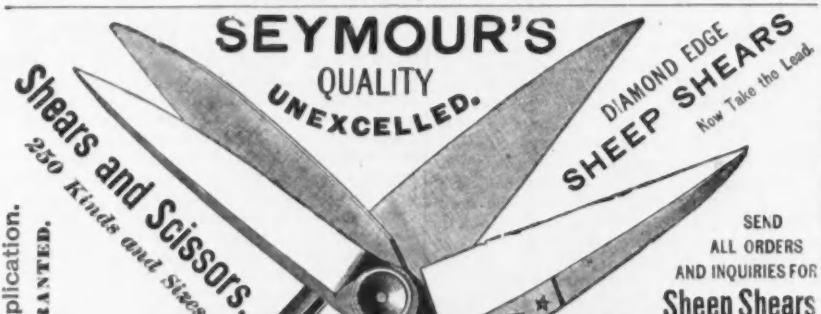
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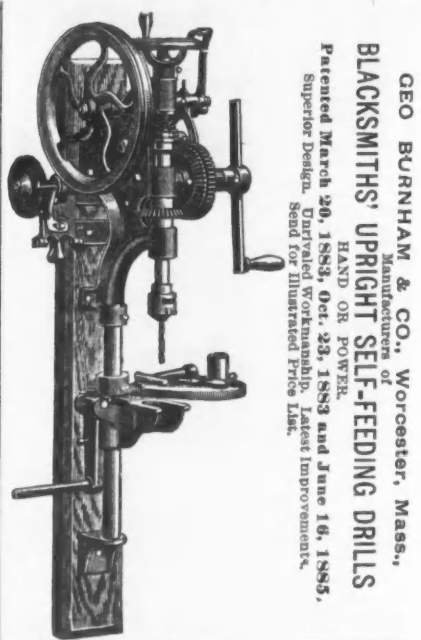
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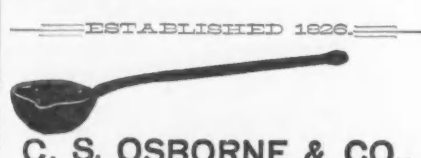
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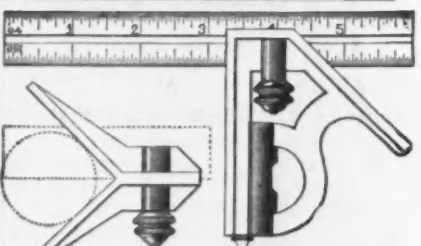


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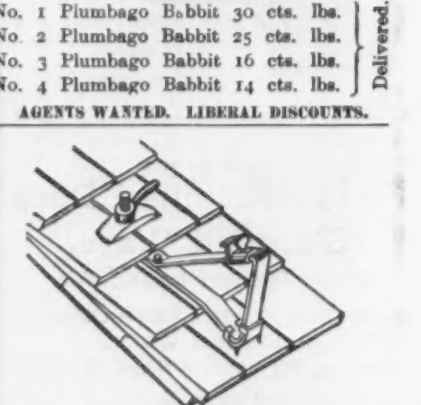
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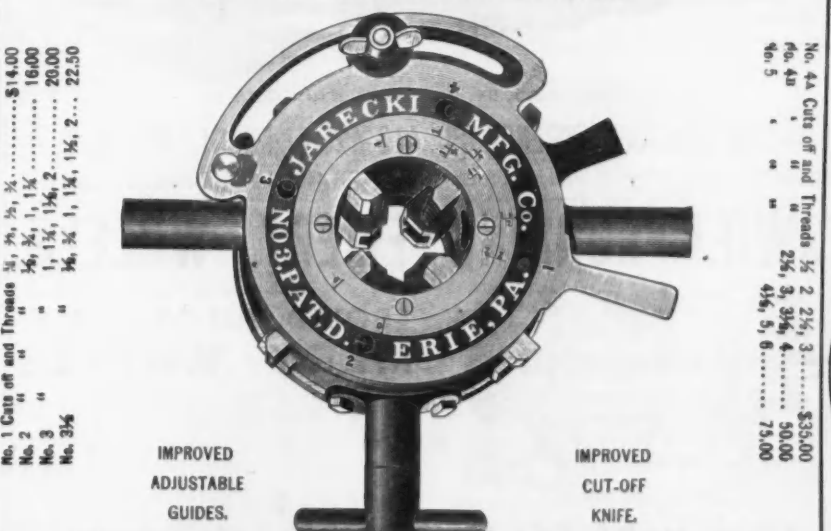
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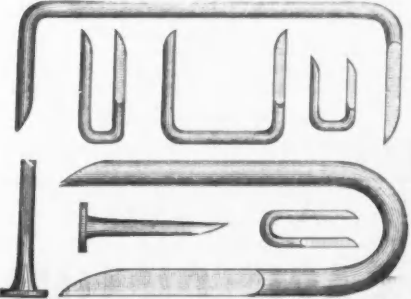
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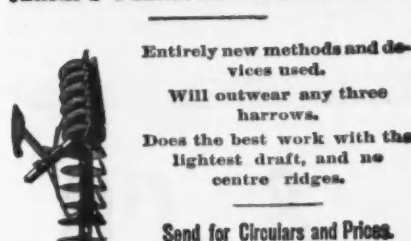


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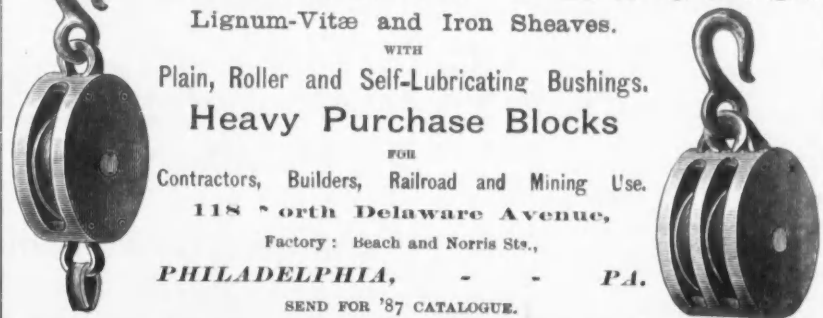
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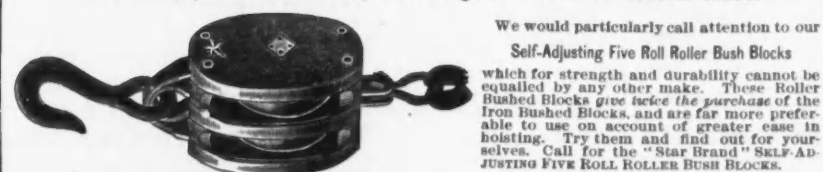


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The Comparative Value of Steam and Hot Water for Transmitting Heat and Power.*

BY CHAS. E. EMERY.

The relative values of steam, water, or other vehicle for the purpose of distributing heat to be used for heating and power purposes, curiously involves, in a large degree, the same elements as the transportation of passengers and freight on railroads. With the latter the relative amount of paying and non-paying load forms one of the most important considerations, while with the former the relative values depend largely upon the percentages of their heat-carrying capacities which can be utilized in practice. In generating steam with fuel the gases may be reduced in temperature nearly to that of the steam itself, securing fair efficiency, but in melting metals they must be rejected at a temperature higher than that of the metal, and economy secured by secondary operations to save waste heat. Similarly the efficiency of the heat transmitting medium depends upon the amount of heat rejected or unavailable by the conditions of the problem compared with that originally imparted to such medium.

If steam and hot water of 400° temperature be respectively used for some heating purpose, such as cooking, requiring nearly that temperature, the steam will give up its latent heat and be converted into a small quantity of water at the final temperature, while hot water can only give up its sensible heat represented practically by the difference between its original and final temperature. If the fall of temperature be from 400° to 399°, the water would impart substantially one thermal unit for each pound of water circulated over the surface, while the steam would impart over 800 thermal units for each pound of water condensed. If a difference of 2° were allowed, the water would impart substantially two thermal units for each pound of water circulated, whereas the heat supplied by the condensation of 1 pound of steam with same limits of temperature would be but slightly reduced, though the relative quantity of water required to be circulated to equal the results obtained with 1 pound of steam would be reduced one-half. By allowing a still greater reduction of temperature the water would appear at less disadvantage. For instance, with a difference of temperature of about 11.15° the water would impart about 11½ thermal units for each pound of water circulated and the steam 342 thermal units for each pound condensed.† This is doubtless a greater reduction of temperature than could be allowed for cooking, and yet it would require (842.04 ÷ 11.52 =) 72.71 times as much water circulated to do the same work as would be required if steam were used. In this case, then, 72.71 pounds of water would necessarily be heated at the station, pumped to the point where the heat was required, and then be forced back again to the station at a lower pressure and pumped into the boiler to be re-heated, for each pound of water evaporated if steam were used as the medium of transmission. The steam would be transmitted by causing a slight difference of pressure from the heating station to the point where it was used, and its surplus pressure would return the water of condensation back to the station, where 1 pound would require to be pumped in the boiler for each 72.71 pounds by the water system.

As the temperature at which the heat is to be applied is reduced, the preponderance against the water system somewhat diminishes. For instance, if steam at 70 pounds pressure be required to operate engines, it may be obtained by directly expanding down the steam of 235 pounds pressure, which would result in a beneficial superheating of 25.87 thermal units per pound of steam thus expanded. If, however, the steam were supplied from hot water at 400.89° temperature, corresponding to the pressure of 235 pounds, only 10.2 parts in 100 would, on reducing the pressure to 70 pounds, flash into steam at that pressure, so in that case 10.2 pounds of water would necessarily be heated at the central station, transmitted to the point where steam is required, and, if high-pressure engines were used, 9.1 pounds would necessarily be transmitted back again, and finally 10.1 pounds pumped in the boiler for each pound weight of steam used, instead of the 1 pound which would be required to be evaporated at the central station in the case of the steam plant.‡ For heating purposes the temperature could under favorable circumstances be reduced to 228° in the coils, corresponding to a pressure of 5 pounds, in which case, without repeating the operations above described, there would require to be circulated from the heating station to the point of supply and back to such station 5.69 pounds of water for each pound of steam utilized at the point of supply, or for the heat which would be imparted at the temperature corresponding to such pressure, for each pound of steam which in a steam system would be evaporated and sent direct from the Station.§

*Paper presented at the Washington meeting of the American Society of Mechanical Engineers, May 31-June 3, 1887.

†(A) Temperature due to 235 pounds gauge or 200 pounds absolute pressure, 400.89°; temperature due to 805 pounds gauge or 220 pounds absolute 399.74°—difference 11.15°. Total heat above 32° in the two cases respectively, 373.75 and 362.17—difference 11.5 thermal or heat units. Total heat steam of 235 pounds gauge pressure, 1304.21 heat units. Subtract 362.17 heat units due to final temperature, gives 942.04 heat units, available from condensation of steam between limits of temperature stated.

‡(B) Total heat steam of 70 pounds gauge or 55 absolute pressure, 1178.34 heat units, which subtracted from 1304.21 heat units due to 235 pounds, foot-note (A), shows 125.87 heat units for superheating. Temperature due to 70 pounds gauge 316.96 corresponding to 266.26 heat units above 32°, which subtracted from 373.75 heat units due to 235 pounds, (A) leaves 87.49 heat units available for making steam with water, and subtracting same from 1178.34 heat units, total heat due to 70 pounds gives 890.85 heat units required for steam of 70 pounds. Hence there will be required 890.85 ÷ 87.49 = 10.2 pounds of water circulated per pound of water evaporated into steam of 70 pounds pressure.

§(C) Temperature due to 5 pounds 227.96° equivalent to 196.96 heat units above 32°, which latter subtracted from 373.75 heat units in water due to 235 pounds pressure, gives 176.79 heat units per pound of water, and subtracted from 1304.21, total heat due to 235 pounds pressure, gives 1127.42 heat units available from steam between same limits, so that there will be required (1304.21 ÷ 117.09 =) 5.694 times as much water circulated as steam.

The above statements may be easily verified from the figures given in the foot notes and the great resistances found in pumping water through pipes at high velocities being well known, there would seem to be no reason why any one should think of using water rather than steam for the purposes above referred to. The subject has, however, been agitated for a number of years. Little plants, to show what could be done with water heated to a high temperature, have been built from time to time, but apparently did not command the capital necessary to start the business on a large scale. Another revival has recently been attempted, however, based chiefly on the favorable report of an unusually well-informed engineer of experience and acknowledged ability, to whom it is a pleasure to say the writer is personally indebted for many valuable suggestions as to proper courses of study at an earlier period of life. Mr. Isherwood, in forming his opinions, has evidently, however, failed to consider some of the most important elements of the problem, and occasion is thereby made for an abstract discussion on the merits of steam and hot water, so far as possible, without reference to the merits of a particular system and the details of the same.

It has been stated in the public press, quoting from the report, that a cubic foot of water at 400° temperature contains 34½ times as much heat as is contained in a cubic foot of steam at the same temperature, and it is therefore concluded that "the areas of the pipes will be in this proportion, making their diameters in the proportion of 1 for the water and (√34½ =) 5.89 for the steam." Also that "the thickness of the material of the pipes for equal strength would have to be about six times greater for the larger steam-pipe than for the smaller water pipe even if both were lap-welded." On the supposition that larger steam pipes would be necessary, comparisons were presented of the "greater bulk," "enormously greater cost," "extra loss of heat by conduction and radiation" due to the larger pipes, with some further remarks about the difficulty of getting rid of the water of condensation in steam-pipes, difficulties of management, &c., not at all warranted by the state of the art in relation to steam plants. Evidently the error behind these statements is to be found in the assumption that because a given quantity of water of the temperature assumed contains 34½ times as much heat as that of an equal volume of steam, therefore the steam pipe must be proportionally larger to that extent. It ignores entirely well-known laws of hydraulics which teach that a fluid of much less density than another will, with the same difference of pressure, flow at a much higher velocity. The weight of a fluid transmitted through pipes with comparatively small differences of pressure at opposite ends, is proportioned to the square root of the fifth power of the diameter of the pipe, into the square root of the pressure gradient (represented by the difference of pressure between the two points divided by the length) into the square root of the weight per unit of volume of the fluid—for instance, the weight per cubic foot, called by Weisbach the "heaviness," and herein designated the "specific weight." Therefore, for the same loss of pressure in the same distance and the same size of pipe, the relative weights of water transmitted would vary as the square roots of the specific weights. The weight of a cubic foot of water at 400° is approximately 53 pounds, and a cubic foot of steam at the pressure of 235 pounds due to such temperature is 0.5478 pounds. The relative weights of the steam and water are therefore as 1 to 96.36. The weight transmitted under like conditions as above referred to, would therefore be as the square roots of those numbers, or as 1 to 9.816. Therefore, if the steam and water be compared on the basis of use for heating buildings exclusively, which, as has been shown, is most advantageous to the water system, there would, as has been stated, be required a circulation of 5.694 times as many pounds of hot water as of steam, but 9.816 pounds of water would, under like conditions, be circulated to 1 of steam.

The relative capacities of the pipes required to convey the steam and water under like conditions would then be for the steam 1, and for the water, the increased weight required—viz., 5.694 divided by the increased weight conveyed—viz., 9.816, or as 1 to 0.5796, or as 1.7253 to 1. But the carrying capacities of the pipes are not as the areas or the squares of the diameters, but on account of the friction element, as the square root of the fifth power of the diameters, on which basis, under this most favorable condition for the water pipe, the diameter of the steam-pipe would require to be but 24.38 per cent. in excess of that of the water-pipe. This does not, however, represent the relative cost of the system. For heat taken the same distance, the return pipe of the water system must be as large as the direct pipe, whereas that of the steam system, which has to do but about one-sixth of the work, could, on merely theoretical conditions, have a carrying capacity that much smaller. For practical reasons which, as will be shown hereafter, will have greater force with the water system, this pipe is made somewhat larger, or on the average about one-half of the diameter of the steam-pipe. On the basis that the costs are proportioned to the lengths and diameters, which is not far from correct when the two pipes are laid together in the same trench, the cost of the steam pipe of 1.2438 diameter should be increased one-half to allow for the return pipe, making in the case of the steam system 1.8657, compared with 2 as the cost of the full size double pipes of the water system, which numbers are as 1 to 1.072. That is, even under the most favorable conditions for the water-pipes, they would cost at least 7 per cent. more than the steam-pipe system, and even this result is obtained by favoring the water system in the calculations, for the reason that the water has to be pumped double the distance that the steam is conveyed, and, therefore, requires double the difference of the pressure. However, as this pressure is produced with a pump, for simplicity the comparison has been allowed to stand as above.

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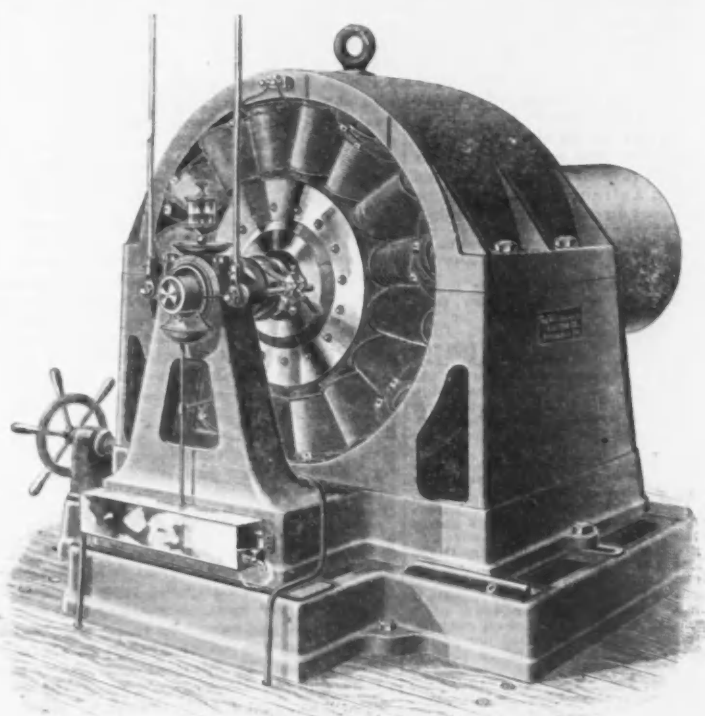


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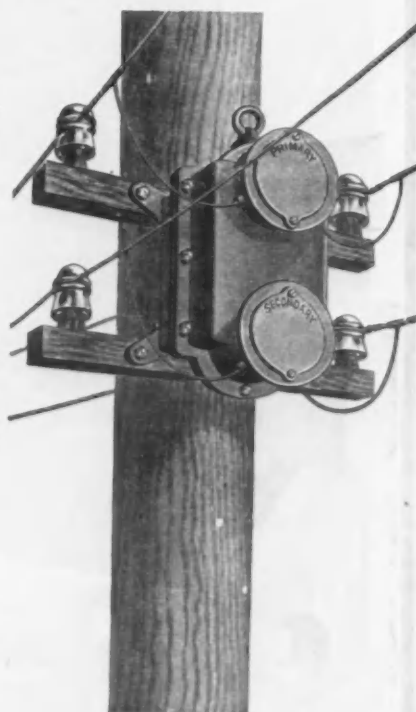
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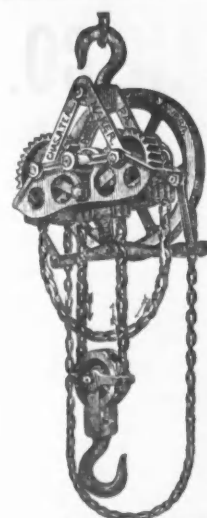
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Death by Electricity.—A number of
interesting experiments have just been made
abroad with such electrical machines as are
employed in industries, with the view of
determining under what conditions they may
become dangerous. These have been con-
ducted by M. d'Arsonval, who has already
established the fact that what is truly dan-
gerous where these machines are used is the
extra current that occurs at the moment the
current is broken, and in order to annul this
extra current, he proposes to interpose a
series of voltmeters containing acidulated
water along the conducting wire. The new
arrangement now employed is at once more
simple and efficient. It consists of a
V-shaped tube made of an insulating sub-
stance, which, after being filled with
mercury, is interposed in the main current.
In order to close the latter it is only nec-
essary to turn a tap which is arranged similarly
to the tap on a gas-pipe. In this way the
machine is unprimed without its being able
to give an extra current spark. Another
arrangement is also made use of, a glass tube
being filled with mercury and dipped into a
reservoir containing the same substance.
This not only permitting the suppression of
the extra current, but also interposing any
sort of resistance in the current. Although
these details appear rather technical, they
relate to a most important matter. The use
of electrical machines is increasing, and it is
of practical use to know that currents are
not dangerous until a power of 500 volts is
reached. It is also of interest to know that
the mechanism of death varies with the
nature of the electricity used. Thus, with
the extra current or with alternating cur-
rents, there is no anatomical lesion, and the
patient can usually be brought back to life
through the practice of artificial respiration,
as employed in cases of drowning.

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power at a distance by generating steam to
be used at 70 pounds pressure, it would be
necessary, as stated, to circulate 10.2 times
as much water as would require to be evapo-
rated for steam used directly, when, on the
same basis previously discussed, the water
pipes would require to have 3.9 per cent.
greater carrying capacity under like con-
ditions than the steam pipe—that is, would
require to be of 1.55 per cent. greater diam-
eter, when the cost of both the direct and
return water pipes would be 35.4 per cent.
greater than that of the steam-pipe and its
smaller return pipe. If, however, the
the water-plant were designed to furnish
water for cooking purposes, and the tem-
perature were maintained in the stoves at
400° by circulating, as claimed, water of
only 400°, there would be required the
circulation of an infinite quantity of water
to fulfill this condition. If, however, the
temperature in the stoves were allowed to
fall 1° below that of the water there would
required to be circulated, as first stated,
something over 800 times as much water
as would be required to be evaporated
and conveyed if the work were done
by steam. Without stopping to calculate
the size of the enormous pipe re-
quired on this basis, we may assume, as be-
fore, that in practical work a loss of say
11.15° would be permitted. On this basis,
as stated, the water required to be circulated
would be 72.21 times the weight of steam re-
quired to do the work, so the water-pipe
would necessarily have 7.407 times the car-
rying capacity of the steam-pipe, or 2.228
times the diameter, and the cost of the two
systems of piping on the basis above ex-
plained would be as 1 for the steam to 2.97
for the water. We thus see that in doing
exclusively the work for which these high-
pressures are principally to be carried—to
wit, cooking, instead of the steam-pipes re-
quiring to be 46½ times the area, or 5.8
times the diameter of the water-pipe as
claimed, the water-pipes must have 7½ times
the carrying capacity, be of about 2¼ times
the diameter, and about 3 times the cost
of the steam-pipes. The relative cost of the
pipes by no means represents the cost of op-
erating the two systems. The water system
would always be at a disadvantage in this re-
spect on account of the high cost of pump-
ing.

It should be stated that it is proposed to
use steam for power at only 20 pounds
pressure, but it is unnecessary to say that
this would involve a very extravagant use
of steam, and the size of the pipes would
only take an intermediate position between
those given for heating and power respec-
tively. It may also be claimed that the fall
of pressure available to transmit steam is
limited, whereas the pressure available by
pumping to force the water is comparatively
unlimited. This will not sustain investiga-
tion. With an initial steam pressure of 80
pounds a loss of pressure of but 10 pounds
will give, in a steam-pipe 12 inches in diam-
eter and ½ mile long, a velocity of fully 80 ft.
per second, so that there will be readily
transmitted through such pipe nearly 1700
horse power of 30 pounds of feed water per
hour for that entire distance. The most un-
favorable conditions for the transmission of
steam are when used for cooking where a
high temperature is to be main-
tained; but even in this case, un-
less the assumption be made that
the water will maintain the ovens at
400° with steam at 400° temperature,
which, as has been stated, will require
an infinite quantity of water circulated,
there must be some loss of temperature, and
as soon as it is permitted to drop, so that in-
stead of fabulous quantities only 72 times as
many pounds of water is required to be
circulated as of steam, the loss of tempera-
ture of about 11° entails a loss of pres-
sure of 30 pounds, and but a portion of
this difference of pressure will circulate the
steam as fast as would be safe for the per-
manence of the pipes. With water the
velocity would need to be kept down in the
inverse proportion of its density compared
with that of steam, for a similar reason. If
the necessary loss of temperature for cook-
ing be made up by increasing the tempera-
ture of the water, this would also, in a much
greater ratio, increase the pressure of the
steam and still keep it at an advantage.
(To be continued.)

Death by Electricity.—A number of
interesting experiments have just been made
abroad with such electrical machines as are
employed in industries, with the view of
determining under what conditions they may
become dangerous. These have been con-
ducted by M. d'Arsonval, who has already
established the fact that what is truly dan-
gerous where these machines are used is the
extra current that occurs at the moment the
current is broken, and in order to annul this
extra current, he proposes to interpose a
series of voltmeters containing acidulated
water along the conducting wire. The new
arrangement now employed is at once more
simple and efficient. It consists of a
V-shaped tube made of an insulating sub-
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mercury, is interposed in the main current.
In order to close the latter it is only nec-
essary to turn a tap which is arranged similarly
to the tap on a gas-pipe. In this way the
machine is unprimed without its being able
to give an extra current spark. Another
arrangement is also made use of, a glass tube
being filled with mercury and dipped into a
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This not only permitting the suppression of
the extra current, but also interposing any
sort of resistance in the current. Although
these details appear rather technical, they
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of electrical machines is increasing, and it is
of practical use to know that currents are
not dangerous until a power of 500 volts is
reached. It is also of interest to know that
the mechanism of death varies with the
nature of the electricity used. Thus, with
the extra current or with alternating cur-
rents, there is no anatomical lesion, and the
patient can usually be brought back to life
through the practice of artificial respiration,
as employed in cases of drowning.

Foreign Markets.

FRANCE.

PARIS, July 9, 1887.—Metals.—Only a moderate
amount of business has been transacted; we
quote without change in price, in francs, 100
kg.: Copper—Chili Bars, 105 @ 108.75; Ingots
and Slabs, 110; Best Selected, 113.75; Tin—Banco,
277.50; Billiton, 275; Straits, 271.25, and English,
271.25. Lead, 30.50 @ 31.50, and Spelter, 38.25 @
38.75. Iron.—Without being brilliant, the iron
situation in France is about as good as could be
expected during the period of uncertainties we
are traversing and the dull summer season. The
Paris market for finished iron may be called
rather firm. We quote Beams, 12.50, and Mer-
chant Iron, 13.50. Old Rails are scarcer and worth
8 francs 75 per kg. At Valenciennes fresh orders
are not plentiful; makers are busy in filling old
ones. Meanwhile they are taking stock at
Charleville, on the other hand, there is a steady
run of orders, sufficient to keep works well
booked; the situation in the Ardennes may, there-
fore, be called satisfactory. St. Etienne is quiet,
but steady. St. Etienne is very busy on war and
railroad material. The Creusot works are quite
busy on locomotives, bridges and armored steam-
ers for Greece.—*Moniteur des Interets Materiels.*

GERMANY.

BRUSSELS, July 9, 1887.—Iron.—Our market is as
firm as ever; there is no lack of orders, and the
outlook is most encouraging for several branches
of iron industry. Machine shops form an excep-
tion, receiving but few orders, especially those
turning out rolling stock. The demand for beams
continues very brisk for England and various
South American countries. Prices still harden.
Moreover, the syndicate of rolling mill owners
maintains prices steadily, and, with the existing
heavy among them, this may remain so for a
year to come. Pig iron is firm. Forge pig is
worth 1.20 francs per 100 kg.; Foundry No. 5, 1.40
@ 1.50. At Charleroi the range for pig is 4.00 @ 4.00.
—*Moniteur Industriel.*

HAMBURG.

HAMBURG, July 9, 1887.—Iron.—The formation
of the syndicate of rolling mill owners in Rhenish-
Westphalia has not failed to exercise a most
healthy influence on the general situation. At all
events arrested at once the drooping tendency
in pig iron in particular, which is now tolerably
firm, although in the Silesian district the depression
is great still. The works of Silesia containing
90% manganese are the only ones wanted, but in
these great animation is noticeable. Boiler sheets
remain well sustained. Makers of thin sheets are
booked many months ahead, but not at over 127
marks per ton. In the wire branch there is in-
creased firmness, but both dealers and consumers
still hold back. Machine shops as well as found-
ries report a partial revival, but the demand for
Cast-iron Pipe is flagging, and prices obtained
very low. In Upper Silesia the pig iron mar-
ket is at a standstill; stocks are large, and also
in dealers' hands. Prospects are gloomy
since it is certain that in Russian-Poland the
building of blast furnaces will commence
soon. At the same time it has been ascertained
that Russia will not strictly carry out the exclu-
sion of German foremen and workmen at the
Russo-Polish Iron Works; consequently, the Si-
lesian branch works are likely to be but little
annoyed and disturbed on that score. In
Rolling mills continue doing remarkably well in
Upper Silesia; they made contracts absorbing
their output for the third quarter at remunerative
figures. Metals in this market have been quiet and
unaltered.

German Lead and Litharge Production.

Lead	1886.	1885.
Stollberg Company	14,478	16,028
Rhenish-Nassau Company	4,970	6,170
Vechemich Company	22,809	23,481
A. Poesgen & Sons, Rahl	3,650	3,910
Reiny Hoffman, Eins.	4,428	4,967
S. B. Goldschmidt, Braubach	4,351	3,901
Rothbach, Siegen	261	368
Walther-Cronck, Rosdoin	6,669	5,906
Tarnowitz	16,758	14,259
Clausthal, Upper Harz	8,427	8,691
Clausthal, Lower Harz	3,399	3,678
Freiberg	4,888	4,928
Total	95,471	96,176
Litharge	3,478	3,871

Production in 1884 was 98,811 tons of Lead, and
whatever decrease there was since took place in
Western Germany, not in Silesia and Saxony,
where there was, on the contrary, an increase.—
Borsenhalte.

ROTTERDAM.

ROTTERDAM, July 5, 1887.—Tin.—Since the be-
ginning of the month Banca has advanced to 62. Bil-
lton spot being 61.25, and October 61.50 @ 61.62½.
The following statement shows the position of
Banca Tin in Holland on the 31st of June, from the
official returns published by the Dutch Trading
Company:

Import in June	1887.	1886.
Import in June	18,776	18,756
Total six months	95,423	74,429
Deliveries in June	14,800	11,500
Total six months	74,446	70,514
Stock second hand	15,769	20,192
Unsold stock	81,854	81,339
Total stock	97,623	271,670
Afloat	4,100	7,209

Statement of Billiton.

Import in June	1887.	1886.
Import in June	8,850	6,500
Total six months	48,524	43,789
Deliveries in June	7,800	6,974
Total six months	46,112	45,422
Stock	25,385	16,770
Afloat	18,540	17,000
Quotation June 30.	Banca 61¼ fl.	62 fl.
Billiton	61¼ fl.	62 fl.
	Koch & Vierboom.	

SPAIN.

BILBAO, June 25, 1887.—Iron Ore.—Single cargoes
continue being taken at 6/10 @ 7/2 Campanil, and
6/6 @ 6/9 Ruidos Superiores. The weather favors
shipments, but steamers are getting scarce. In
the Deserto the steamer Ocho is loading for
America, one of the largest that ever entered this
harbor, having a capacity of 1977 tons. Shipments
to date 2,355,996 tons, against 1,631,963 in 1886. Pig
iron is doing well for abroad, and is dull for the
Peninsula.—*Bilbao Maritime y Comercial.*

CHILI.

VALPARAISO, May 13, 1887.—Copper.—In spite of
unfavorable cable news from England the drop in
exchange has caused a slight advance in Copper,
30.02 quintals selling at \$15.20 @ \$15.40, which
equals \$20. 7/8. Nitrate.—A large business has
been done in spot and near delivery, some 1,200,000
quintals changing hands at \$2.50 @ \$2.55, 1/2.
\$2.54½ equating 7/10 3/4 cwt. In England April
shipments to Europe have summed up 27,800 tons,
and for the United States 11,800; loading May 1,
36,600 and 6,500 tons respectively. Charters for
Europe, 15,500 tons.

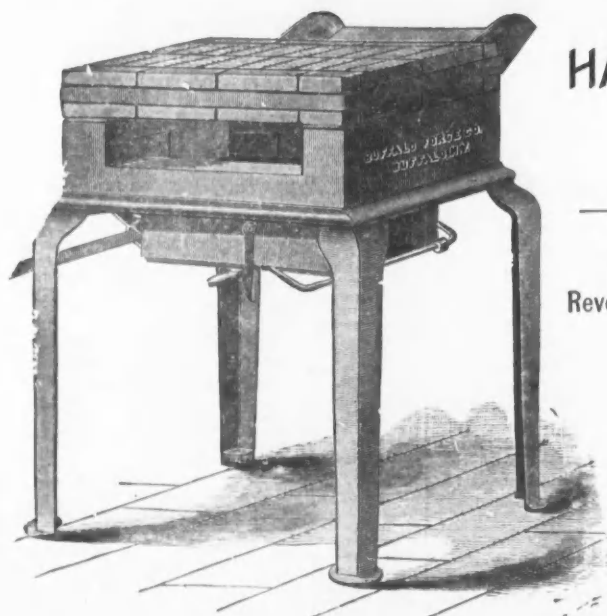
Shipments During the First Four Months.

	1887.	1886.
To the North of Europe	2,332,801	1,519,199
To the Mediterranean	103,136	57,308
To the United States	698,375	482,437
To the Atlantic	118,296	82,113
To the Pacific	3,232,608	2,340,367
Total	6,483,015	4,481,024

Coal.—West Hartley Newcastle sold to some ex-
tent at 25.9 on the spot and 26.5 afloat, but light
shipments this way finally caused March ship-
ment to be paid 27. Australian coals and does
not bring over 22.6. Exchange.—The closing
quotation is 25.4d. for 90 days' sight drafts on
London.—*Weber & Co.*

The new steamer Olivette, 1611 tons, built
by Cramp & Sons, of Philadelphia, and
owned by H. B. Platt, of New Haven, proves
to be among the fastest American steamers
afl at.

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Style	H, Maple	Sheave, Metaloid	bushed,	Hook, 5/8 in.	Net.
"	I, Lig.	"	"	"	"
"	K, Iron	Pat. roller	"	"	"
"	O, Maple	Wood	"	"	"

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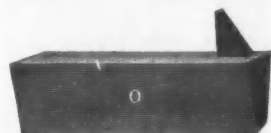
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Toe Calks,

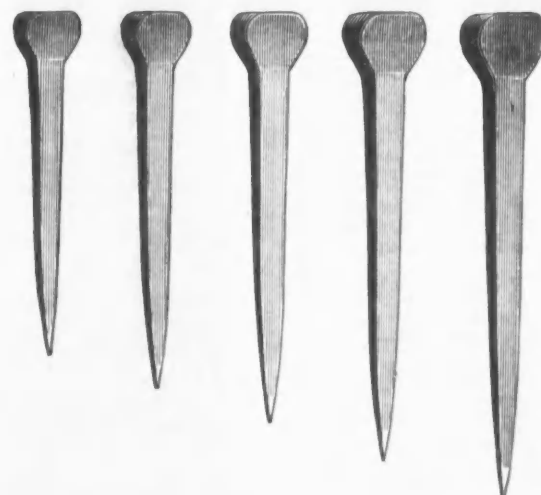


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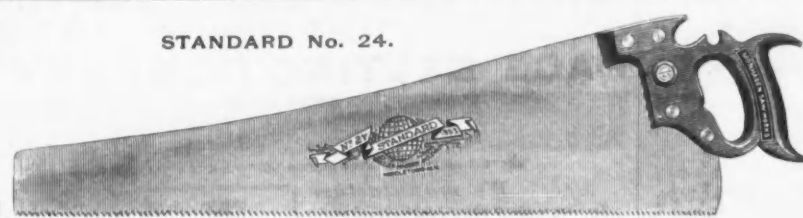
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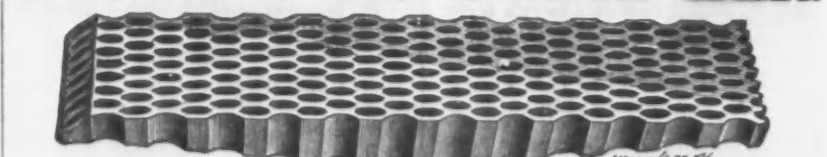
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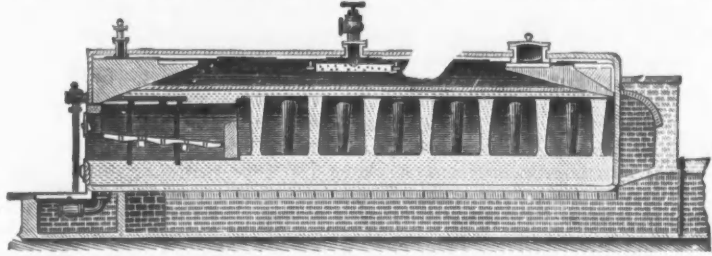
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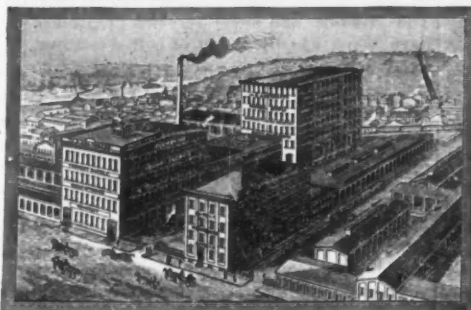
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ENGRAVERS WORCESTER, MASS.

English Letter.

(From Our Regular Correspondent.)

LONDON, July 4, 1887.

THE HOT SPELL.

which has been in existence here for some weeks past, is causing a good deal of inconvenience at many of the iron, steel, tinplate, &c., works. As you are doubtless aware, many of these concerns obtain their water for boiler use from rivers and other riparian sources. In other cases they are supplied from the mains, where such exist. Owing to the remarkably dry spring and the present heated period, many of these streams have now given out; indeed, all over the country water is singularly scarce. As a consequence the works have either to stop altogether or have to arrange for small and unsatisfactory supplies. At Swansea and other places there is quite a water famine, the indispensable liquid being sold at rd. a bucket for household purposes. In the Midlands and North of England the heat has been and is so great that the men have been unable to work during the greater part of the day; consequently the supply of certain products—especially those of the puddling furnaces and rolling mills, has been much contracted. This state of things is no particular disadvantage to the market; indeed, there are manufacturers who are glad of any excuse to reduce their production. This time the excuse is a thoroughly good one, for with the temperature at 140° to 160° in the sun, and 85° to 95° in the shade, it is practically impossible for the workmen to withstand the added heat of furnaces and red-hot metals. Our rainfall this year has been remarkably deficient. In February there was no rain, and we have had but little since. Our last wet day was on May 9, and there was a heavy shower on June 9, since which we have had the scorching sun daily. The crops are beginning to be affected prejudicially, and unless there is an early change, there will be a heavy shortage here and in Western Europe generally, for the American farmers to supply in due course.

So far as the metallurgical trades are concerned, there is not a great deal that is new to be recorded. There is a fairly good demand for most kinds of iron, and steel is in full request, but prices do not move appreciably and the outlook is not better than moderate.

THE IRON MARKET

has been rather unsteady, chiefly owing to a close struggle between the "bears" and the "bulls." The former have had on their side exceptionally low shipments of Scotch iron, while against them have weighed some fairly good inquiries from America and the Continent, as well as a little better inquiry from home consumers. The state of the Scotch market is still most unsatisfactory, and attention is being diverted once more to the problem of the large output and the incessantly increasing stocks. Glasgow warrants closed at £4. 2/3 p. ton. Of Cleveland the most important point to be observed is that buyers have been more cautious and less anxious for business. Makers will not sell No. 3 G. M. B. below £3. 5/ p. ton. The shipments from Middlesboro' have been good, and there is less iron floating in the market than there was a month ago. On the West Coast a firmer tone prevails, and although prices have not advanced they have been less difficult to secure than just lately. Buyers are still engaged chiefly in warrants, but makers continue to decline the prices offered. Nominal quotations for mixed numbers remain as before. In Staffordshire there has been a little movement, owing chiefly to the difficulties caused by want of water. In the sheet trade demand has been somewhat brisk, and prices have stiffened to a slight degree. Nevertheless, it is only on account of the hot, dry weather that has prevailed, as buyers know that unless rain speedily falls several works will have to stop running. The stock of sheets is relatively small and the productive capacity is not unduly extensive. Galvanized sheets have also been in greater request, and a fair amount of business has been done. A quiet movement has been experienced in bars, hoops and rods. The heavy branches are maintaining the position recently assumed, and most of the works, all things considered, are tolerably well employed. For old rails United States buyers are making extensive inquiries, but it is their intention to keep the market as "dark" as possible. On the other hand, holders declare their unwillingness to meet the terms offered, and prefer to wait awhile before selling. Old scrap is in fair request, but there is still too wide a difference between holders and buyers for much business. Freights generally have undergone no change, and to and from all ports late rates prevail. Pig iron from Glasgow to New York by ordinary steamer remains firm at 10/ p. ton. Steel is in excellent demand, and all departments are busy, with the exception of that devoted to sleepers, in which greater activity would be welcomed. Business in blooms with the United States is again reported, but buyers are anxious to keep values below £3. 15/. Makers, however, are firm, and, although a compromise between that figure and £3. 17/6 asked by makers may have been agreed upon a few days ago, it is now difficult, if not impossible, to buy under makers' quotations. Billets are fairly inquired for, and Siemens-Martin are quoted 92/6 @ 95/, f.o.b. Glasgow, while for basic 72/6 @ 75/, f.o.b. Glasgow, while about 76/6 f.o.b. Middlesboro' is now the price asked. Steel rails for the Bombay and Baroda Railway Company, asked for two or three weeks ago, have been placed with the Darlington Iron and Steel Company, Limited, at £3. 19/ p. ton, f.o.b. Middlesboro'. The section that is ordinarily used by the Indian States, and is a double head. The fish plates have been taken by the Tredgar Iron and Coal Company, Limited. There are rumors of several large orders for the United States, among which are two lots—one of 5000 tons and the other 11,000 tons. Both of these lots are purported to have been placed on the West Coast, one presumably with the Barrow Steel Company, Limited, and the other with the Moss Bay Iron and Steel Company, Limited. These transactions, if concluded, have been very secretly put

through. Among the inquiries of the week are 18,000 tons for the Indian Midland Railway Company and about 7000 tons for railway extension in Burmah.

TIN PLATES.

In London there is a decidedly stronger feeling, the scarcity of water in and around Swansea and other centers of the trade having seriously interfered with the production of many of the mills. Two at least have been compelled to cease operations, and unless rain comes very speedily others will have to follow suit. This, combined with the fact that most of the works are well off for orders, has served to give a considerable degree of strength to the market, and now I cannot quote ordinary IC cokes below 13/3 @ 13/6, f.o.b. Liverpool. At Liverpool the improvement in the tin-plate market continues to grow apace. There has been quite a rush, especially forterne plates and certain special sizes of tin plates, but they are for rather quick delivery. In Bessemer steel cokes there has been a great deal doing of one sort and another, both in ordinary as well as in special sizes, and there are but very few, if any, brands obtainable now at 13/6 IC. Prices range from 13/9 to 14/3 IC. In Siemens steel plates with coke trimming, though there is not much doing, prices have been advanced all around, and 14/ @ 14/6 IC are now the ruling figures. Bessemer best coke plates are quoted at about the same figures mentioned last week. Coke tin plates are quiet. The demand for wasters, both cokes and steels, still grows. The prices of wasters range from 12/6 to 13/. There has been more doing in charcoal and best charcoal tin plates. Ordinary charcoals range from 14/0 to 16/ IC up to 18/ for best sorts. The greatest improvement of all has been in terne plates, for which there has been a very brisk demand during the last few weeks. It appears that the stocks of both tin and terne plates are extremely low, both in the States and Canada, and it is a well known fact that they are so on this side.

Boring for Natural Gas at Chicago.

The question of natural gas is being revived once more in South Chicago, says the *Chicago Evening Journal*, and this time, to judge from appearances, it is considered quite likely that some positive progress toward the discovery of that unseeable yet valuable article will be made. Major George W. Erwin, a gentleman who has had a long experience with oil and gas wells in the East, has been investigating the ground around South Chicago, and with seemingly satisfactory results. A stock company have been formed with a capital of \$200,000, all of which, with the exception of \$20,000, has been paid in. It is the intention of the company to begin boring wells at once.

Natural gas was first discovered in South Chicago about 12 years ago, by John B. Charboneau, near the corner of Buffalo avenue and Ninety-second street. He had built a house there and begun to sink a well in hopes of getting water. Instead of water he struck a vein of natural gas and sinking a pipe in the ground he utilized the volatile product for cooking and lighting purposes as long as he lived there. A great many South Chicagoans remember "old Charboneau's gas well," and numbers of strangers visited the place to look at the then wonderful curiosity. Shortly after Charboneau moved away, the house burned down. The gas-pipe continued, however, to emit its yellow tongue of fire for a long while, gradually growing less though, until it finally went out. Should gas be discovered again it will find a ready consumer in the mills that are the life of the town. [Inquiry of the officers of the North Chicago Rolling Mill Company establishes the truth of the above statements, although the company named are not taking part in the present proposed search for natural gas.—EDITOR IRON AGE.]

The Brown & Van Arsdale Mfg. Company, manufacturers of wagon supplies at Grand Crossing, near Chicago, confessed judgment last week in favor of David Kelley, of Kelley, Mans & Co., for \$39,175. The debt was due Mr. Kelley on his personal account and not the firm. Afterward Charles Himrod & Co. entered up judgment by confession against the company for \$1000, and immediately filed a creditor's bill, making the usual formal charges of fraud. By consent, George R. Geary was appointed receiver of the company. The firm, who did a wagon-supply business, were started in 1860 under the name of C. B. Brown & Co. They were formed into a stock company in 1871 with a capital stock of \$80,000. C. B. Brown was the president and Wm. H. Brown vice-president. The works were established at Kingsbury and Michigan streets, Chicago, until last winter, when they were removed to Grand Crossing. The present plant is estimated to be worth \$100,000. The business will be closed out at once. The cause of the failure is said to be poor trade and slow collections.

Messrs. Michaelis & Casparius, Berlin, Germany, are manufacturers of castings by a process, the details of which are not given, which appears to yield excellent results in the way of allowing for welding and forging. Mr. A. Martens, of the Royal Testing Laboratory, Berlin, has recently made an examination of a series of articles produced by them, including a variety of parts of Mauser gun, shears, parts of wringers, &c. The result shows that the material can undergo an exceptional amount of torture without showing signs of distress.

The Mountain View copper mine, of Butte, owned by C. X. Larrabee and the Montana Copper Company, an adjoining property equipped with a large smelting plant, controlled by Lewisohn Brothers, of this city have consolidated, Boston capitalists, identified with the Osceola and Tamarack mines, going into the new organization. The mines are known to have very large reserves of untouched ore of high grade, and the new combination will become one of the great factors of the copper trade.

The Iron Age

AND METALLURGICAL REVIEW.

New York, Thursday, July 21, 1887.

DAVID WILLIAMS, - - - Publisher and Proprietor.
JAMES C. BAYLES and
CHAS. KIRCHHOFF, Jr., - - - Editors.
GEO. W. COPE, - - - Associate Editor, Chicago
RICHARD R. WILLIAMS, Hardware Editor.
JOHN S. KING, - - - Business Manager.

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CINCINNATI.....Corner Fourth and Main Streets
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CHATTANOOGA.....Ninth and Carter Streets
S. B. LOWE, Manager.

Peru and Her Foreign Creditors.

In our editorial on "Peruvian Progress," in March last, we gave the general outline of the proposal of Mr. Grace, of New York, to the Government of Peru, as the representative of the European bondholders of the Peruvian debt, for the cancellation of part of the latter and the extension of the railroads. In March, Mr. M. P. Grace, of the firm of W. R. Grace & Co., New York, arrived from Lima and left for London accompanied by Dr. Arana, the Peruvian Commissioner, the result of the trip being an arrangement with the Committee of Bondholders in June, since accepted by the Government at Lima, and awaiting ratification by the Peruvian Congress. As American trade is expected to be particularly benefited by the regeneration of Peru on the basis of this agreement, it may not be out of place to note the conditions which have proved acceptable to both parties to the contract under the circumstances:

The Peruvian Government relinquishes to its creditors for 66 years 763 miles of its railroads, which the latter engage to extend as stipulated. It furthermore relinquishes to them all the guano the Government still owns on the coast, and all that may still be discovered, for a term of 66 years. As long as the railroads and guano do not net to gether the sum of £420,000 during two consecutive years, the Government agrees to set aside the annual sum of £120,000 out of the customs revenue of the ports of Mollendo and Payta to square the deficiency. Peru also grants the creditors forever the coal mines it owns along the Chimbotu-Huarez Railway, but while doing so retains 15 per cent. of the net profit those coal deposits will produce. Another concession grants them the exclusive right of exploitation during 50 years of the Huancavelica Cinnabar mines, 15 per cent. to be paid the Government out of the net profits while the grant lasts. Next, the perpetual privilege is conceded the creditors to work all the gold, silver, copper, lead mines and other mineral deposits, the Government only to collect the usual tax of \$30 per annum to which every mine in Peru is subject. A grant is made them of 1,800,000 hectares of arable land, and each

family of settling immigrants is besides to receive 180 hectares under contracts with the creditors' representatives. The Government finally concedes them the privilege of free navigation on the rivers and lakes of the Republic. The creditors are to have the right of at once founding a bank of issue at Lima, with the exclusive privilege during 25 years of issuing bank notes. This issue to be backed by 33½ per cent. cash. The syndicate obtains 75 per cent. of the net profits of the bank after paying its shareholders 9 per cent. per annum. The bank is to manage the home indebtedness of Peru, to secure which the Government agrees to set aside annually 8 per cent. of the customs' revenue collected at Callao, other revenue designated in section 22 of the agreement, and its share of 25 per cent. of the net profits of the said bank after payment of the 9 per cent. alluded to. Certain privileges exempting the property of creditors from taxation are stipulated in addition to those enumerated.

In return, the bondholders agree to carry out the railroad repairs and constructions stipulated, to pay the Government 20 per cent. of the net earnings of the said railroads, and 25 per cent. of those of the guano deposits, after the representatives or committee shall have received therefrom the sum of £420,000. The bondholders agree to surrender 50 per cent. of the bonds they hold, the total outstanding bonded debts amounting to £320,000,000; the remaining 50 per cent. the committee take their chances to recover from Chili as the owner of the ceded province of Tarapacá. The bondholders further agree to furnish a capital of £350,000 for the said bank of issue, toward which 33½ per cent. of the shares are to be subscribed in Peru. The bondholders finally agree to advance the Government at once £400,000, payable in 30 consecutive monthly payments, out of which the Government engages to pay £6000 per month toward defraying the interest on the internal debt, and transportation over the said railroads of military and civil officers, material and mails.

When the terms of this agreement were made known in London, the secretary of the Chilean Legation in that city wrote a letter to the London Times, in which he warned Peruvian bondholders against any illusions in connection with the one-half of the Peruvian bonded debt and the conquered province of Tarapacá so far as Chili was concerned. He referred to the treaty of peace between Chili and Peru, by the terms of which the conquered province of Tarapacá was ceded without Chili assuming any responsibilities whatever that might be construed as though Chili had considered or ever would consider the same pledged to Peruvian bondholders. He also reminded the latter that the highest English and French courts of law have declared that the said bonds, however worded, constitute no lien whatever on the territories acquired by Chili by conquest or on the stocks of guano and nitrate. This settles the question so far as relief from Chili is concerned, but even with this drawback the arrangement is probably the best and most practical that could be made with a country utterly ruined, whose inhabitants are known not to be very energetic and where the moral standard is not of a high order.

The chief Government railroad relinquished is the Oroya line from Lima to the Corro de Pasco silver mines at the top of the Cordillera, where untold riches are believed still to exist, and it has been intimated that Baring Brothers, of London, will be ready to float a railroad loan thereon on behalf of bondholders to the amount of £2,000,000. At any rate the Peruvian Government shows the good-will to do what it can to raise the country from the desperate condition to which it has been reduced by surrendering on fair terms what it still calls its own. Peru in this transaction exhibits a more manly disposition than either Tennessee, North Carolina or the two Virginias have shown in our own South in dealing with their creditors.

A few weeks since we published a series of letters from a large number of leading mail manufacturers, East and West, bearing on the condition of the trade in that great staple. At the time the industry was going through a crisis, brought about largely by sales at ruinous figures by makers who were pressed for funds or by sellers of raw material who had taken over manufactured stock to cover accounts. Low prices thus made were promptly met by at least a few of the large works, while a goodly number of others preferred either to stop work entirely or to accumulate stocks, or sought relief by attempting to reduce wages. The general tenor of the remarks by our correspondents when dealing with the question of suggesting means for the relief of the trade was not hopeful. The majority could see no other way than to let affairs take their course. The burden of their argument was that there is a very large excess of capacity, much of it scattered among small concerns, so that an improvement could only come after those had been driven out of the business who were too weak to remain in it. The outlook presented by such a course was sufficiently discouraging to lead to some efforts at a quicker solution of the problems involved. At a meeting of the Eastern Rail Association about a month since, a committee was appointed to ascertain whether or

not there would be some prospect of devising a plan by which ruinous competition might be avoided. It was understood that the formation of a pool was contemplated, involving an allotment of output, and guarding against a further increase in the capacity. In spite of the fact that a goodly share of the present troubles in the rail trade are due to the operations of such combinations in the past, a number of prominent members of the trade have been zealously at work. They have met with much indifference and some opposition, notably in the West, but the more sanguine hope to see the proposition take definite shape at the meeting being held in Philadelphia as we go to press. In view of the fact that modifications in the plans are probable, even at the last moment, the details are withheld. The trade will look forward to them with much interest. It is almost superfluous to state that unless all points of weakness are extremely well guarded, unless the pool practically includes all of the manufacturers, East and West, it will command little attention. It will take an exceptionally rigid and practically unanimous association, wielding its power very judiciously, to cause buyers to have any belief in a lasting improvement of the trade, since the past has pretty thoroughly shaken their faith.

The Railroad's Right to Live.

In authorizing the receiver of the Oregon and California Railroad, because of water competition, to accept a lower rate for a longer than for a shorter haul, Judge Deady epigrammatically held that a railroad had a right to live. There is no doubt that the Judge's decision was a just one in the case before him. The railway company in question suffered severely from ocean competition, and the language of the Court was not too strong under the circumstances. Some of our daily contemporaries have been drawing conclusions not fully warranted by the case. It should be noted that the Judge's decision refers to a railroad affected by water competition only, and on this point the decision is in harmony with the finding of the Interstate Commission. The case cited by the Court in its opinion is that of the Government against the Union Pacific for transporting United States troops at local rates from Council Bluffs to Ogden, such rates being higher than the Union Pacific's share for a through passenger to San Francisco. The railway was sustained, but this is a very different matter from charging a higher fare in the aggregate for local than for through passengers, and the newspaper reasoning based upon the erroneous view falls to the ground. Aside from water competition there are other sets of circumstances which may likewise justify an infraction of the fourth section of the Interstate law. There may be two or more railways competing for the traffic between two trade centers in such a manner that while the one railway is almost a direct line between the two termini the other may be so circuitous that traffic from the one city will pass on its way through other places at a greater distance from the destination than the originating point. Pittsburgh and New York are illustrations. The Pennsylvania Railroad is the direct line. The Pittsburgh and Lake Erie Railway is a line built northwesterly from Pittsburgh, connecting with the Lake Shore at Ashtabula, and passing through several populous manufacturing centers. Geographically, these smaller towns are further from New York than is Pittsburgh, and at the same time are on the line circuitously leading thither. Does the short-haul prohibition apply? As a practical answer to this question, we are glad to see that the Pittsburgh and Lake Erie management have published the same rates from Pittsburgh to New York City as the Pennsylvania, leaving the intermediate towns on their road at the former higher figures.

It is in every way desirable that competition between carriers should be preserved in the United States. It was for this end that pooling was prohibited, and it is scarcely credible that any other section of the laws should be intended to prevent so desirable a result. This practically is what the short haul section would do if applied literally to such a case as we have mentioned. That section was clearly designed to prevent one city from getting an undue advantage over another nearer the common market, but where the city supposed to be aggrieved by the higher rates is really many miles further away the mere fact that the roundabout route of the traffic carries it through this complaining city does not alter its geographical position. If this position does not entitle it to tariff concessions without this circuitous competition, then the case is not altered by such an indirect line. This is a mere accident of service. Youngstown, Ohio, is not by its position justified in demanding Pittsburgh rates to and from New York, even though competitive traffic from Pittsburgh should pass through it. The same reasoning applies to the Wabash Railway whose receiver is taking Peoria shipments through Jacksonville, Ill., to the East, Jacksonville being further from the seaboard than is Peoria.

We do not see in the cases cited any real infraction of the principle of the short haul section. This briefly is that railroads may, under the law, equalize the advantages of trade centers unequally distant from some

common market, but shall not give to the more distant city a more favorable rate than to the near-by town without some reason stronger than mere caprice. If it is a matter of life and death, then undoubtedly Judge Deady's epigram applies—"a railroad has a right to live." Much of our railroad troubles in the past have come from a forgetfulness of the truth that a right to live involves also a just consideration for the lives of others, whether persons or railroads or towns. In the case of Richardson vs. the Utica and Black River Railroad (N. Y. Railroad Commissioners Report for 1885) it was held that "a larger charge for a shorter haul than for a longer one is *prima facie* unreasonable, and that railroads should show cause why such charge is reasonable." That is the common sense of the matter, and in the cases of the Pittsburgh and Lake Erie Railroad and the Wabash Railway, just mentioned, the fact that competition is thereby preserved while no injustice is done to any city geographically more favorably situated, is conclusive of the rightfulness of the competitive and equalized freight rates named. But the full offenses against the law without such dissimilar circumstances are not thereby made lawful or right.

Increasing Use of Wire Cloth.

Wire cloth is an article which has but recently been brought into general use. For a long time its high cost precluded its use for almost every purpose but for articles with at least some claims to being ornamental. The window and door screens of former days were usually made of cotton netting, dyed in fancy colors and warranted not to last more than one season even with the utmost care. The few wire screens that were used were articles of such luxury that they generally bore a printed landscape or other pictorial representation to indicate more strikingly their aristocratic character. The housekeeper who would have inserted such screens in every window of his dwelling would have been an object of wonder to an entire community for his colossal extravagance. Coarsely woven wire cloth was then used for a few purposes, principally for sieves and cellar-window guards, but the total quantity so used in a year in the entire country was insignificant.

Now, however, the wire cloth industry, including the manufacture of large meshed netting, is a very important adjunct of the wire trade, enormous quantities of such goods being made annually in quite a considerable number of factories. The increased use of wire cloth and its gradual reduction in price have gone hand in hand, every recent year seeing more and more dwelling houses furnished with screens for windows and doors, not only in mosquito-ridden districts, but in localities whose greatest insect pest is the ordinary house fly. Their general introduction has also been greatly facilitated by the efforts of ingenious and wide-awake manufacturers to provide the means of making the necessary frames at low cost, and with a minimum of mechanical skill. From all these causes, and not because flies and mosquitoes are greater pests than ever before, the present season has witnessed the most active demand for wire cloth ever known.

The use of wire cloth is also extending in many other directions, as people grow familiar with it and note its adaptability. Threshing machine sieves were formerly made of perforated metal, but large meshed wire cloth is rapidly taking its place, because the grain can fall through the meshes of the cloth more easily than through the perforated plate with its holes necessarily some distance apart. Corn cribs are being built, with sides and bottom made of heavy wire cloth, which proves to be especially well fitted for this purpose, as the air passes through it so easily and rats cannot gnaw it.

A number of such instances might be given to show the widespread use of wire cloth, but it is unnecessary. Two rather strange means of utilizing it will end our illustrations. One of these is the preparation of surgical bandages. It has been found that for this purpose wire cloth has special merit. It is stiff, obviating the use of splints. It is open, ventilating inflamed parts and allaying irritation, and it can be conformed to any special shape with little difficulty. The other method of using wire cloth is in the manufacture of coffins. A Chicago coffinmaker uses wire cloth as the body of his caskets, filling in a cement which rapidly hardens, and forms an almost indestructible receptacle for the dead, while it effectually covers and conceals from view the material which holds it in place.

Germans continue to cling persistently to the idea that syndicates and combinations are the only salvation for the woes of which they complain in the iron and steel trades. Lately 14 out of 50 works in the Rhenish and Westphalian districts, among whom are all the largest of that section, agreed to form a combination in order to improve the condition of the manufacturer in the iron trade. Similar combinations have existed among them before, and while their experience with these earlier associations have always been marked by the unanimity universally claimed for such syndicates, they have been forced this time to go one step further and appoint a selling agent in the principal city of the district; meanwhile second hands are

offering iron at prices considerably below the combination, which has been held up as immaculate for some time past. The tone of some of the German trade papers indicates that confidence among those outside of this syndicate is rapidly waning.

Manual Training in the Public Schools.

The meeting of the National Educational Association in Chicago last week was the occasion of an important demonstration by the advocates of manual training as a part of the ordinary public school course of instruction. The Chicago public school authorities showed that they were fully abreast of the most advanced leaders in the new education by collecting for the inspection of visitors a large number of samples of free-hand drawing, carving, modeling, &c., done by the pupils in the Chicago schools. The specimens exhibited attracted much attention and evoked decided commendation, especially as the fact was emphasized that they had not been prepared wholly with a view to exhibition, but in the regular performance of school duties, and without interfering in the slightest degree with the usual school studies. The course of instruction in this respect was not entirely in the line of so-called art education, but embraced as far as possible, with the limited appliances available, a knowledge of the practical or utilitarian. In connection with the Chicago display, exhibits were made by other cities of the West, which, though not so striking or extensive, were of decided interest as indicating the hold which this idea of manual training has taken upon the public mind throughout a large portion of the country. Some Western colleges also showed what they were doing in actual mechanical training, exhibiting creditable specimens of work turned out by their students from the joiner's bench and the machine shop.

The advocates of manual training also made the matter very prominent in other ways. They had organized a department of the national association for the special purpose of considering questions connected with industrial education, and by which a separate session was held. Chairman Ordway of this department delivered the principal address. He stated that of late the opinion has grown in favor that in addition to intellectual training "boys should also be taught something that will aid them in earning a livelihood. This view gave support to the growth of manual teaching. But the principle is a wrong one. Manual training should not be taught with any economical motive in control. The public moneys should not be used to make carpenters or bricklayers any more than to make lawyers or doctors. In this country the Russian system of teaching was first adopted. Its fundamental principle lies in limiting pupils' work to parts, not allowing them to complete anything. We adopted this system in Boston, in 1876, but found after two or three years' trial that it was not satisfactory. Boys wearied of forever welding, cutting and rewedding the same piece of iron or of making table legs and never a table. Boys want to see something accomplished. So we changed the system and began to have boys make complete boxes and tables. It took more work and more teachers, but the boys were at once interested. The work gratified and stimulated the pupils and made them push us instead of waiting for teachers to push them. I found that this system had already been adopted in Sweden, and very highly developed. Sweden was then and still is ahead of all other countries in the matter of manual training and is behind none in other kinds of education. In Sweden they do not confine a boy to parts, nor do they attempt to produce carpenters or blacksmiths; but they train the boys to use their hands and heads at the same time."

The discussion which followed was of great interest, vigorous exception being taken by some of the members to the chairman's idea that economical interests should not weigh in the matter of manual training, the dissenters believing that boys should distinctly understand that they were learning something useful to them in making their way in the world. The subject of art and industrial education was further considered at a dinner given by John S. Clark, of the Frang Educational Company, of Boston, for the express purpose of bringing together prominent persons identified with the movement. This incident is mentioned to show the zeal and enthusiasm actuating the advocates of the new education, who are now inclined to look upon themselves as the disciples of a new dispensation which has sprung up and is making most rapid headway under their preaching and teaching. At this dinner Mr. Allan C. Story, president of the Chicago Board of Education, stated that he hoped to see manual training schools conducted in connection with all public schools and attendance thereat made compulsory. Some legislation might be needed to help that forward in Illinois, but the exhibition just made at Chicago would help to lay the foundation for that legislation. The professions were greatly overcrowded; the demand in mechanical pursuits had to be filled by foreigners. He prophesied an early great forward movement in mechanical educational development.

The earnestness with which this question of manual training is being taken up everywhere throughout the country is most gratifying to those who recognize that our future

greatness among the nations of the earth rests largely upon the mechanical ability of our people. Every step taken toward popularizing mechanical pursuits among the pupils of our schools is a stone in the pyramid of industrial independence which we are now rearing so rapidly, and which bids promise of soon becoming a completed structure.

Growth of the Wire-Nail Trade.

The rapidity with which wire nails are growing in favor, especially in the West, is not appreciated by those who are not brought directly in contact with the movement. A few facts will illustrate the great strides which have been made in a very short time. A prominent Chicago merchant states that year before last he sold only 500 kegs of wire nails of all sizes. Last year his sales jumped to 2500 kegs. This year, basing his estimate on the transactions of the first six months, he will sell nearly 30,000 kegs. For a large part of this spring and summer his sales of wire nails have equaled and sometimes exceeded those of cut nails. It is true that the cut-nail trade was somewhat dull at the time, but the fact is nevertheless striking that such a condition of affairs should exist, for it would naturally be supposed that a light demand for cut nails would arise from general causes affecting the consumption of all kinds of nails.

Not long ago a number of prominent Western cut-nail manufacturers, who met to consider the condition of trade, estimated that fully 25 per cent. of all the nails then being sold in the West were wire nails, while in certain localities of heavy trade, the sales of wire nails from first hands were actually in excess of those sales of cut nails. Another feature of the wire-nail trade is the growing magnitude of transactions. No longer are a few papers ordered at a time, but transactions of 1000 to 3000 keg lots are quite common, and recently a single sale of 7500 kegs was reported. Even retailers are now ordering wire nails by the carload, although in many cases they order a mixed assortment of cut nails and wire nails, which may eventually compel the keeping of a mixed stock by both cut-nail and wire-nail manufacturers. The demand for large sized wire nails by the railroad companies is also getting to be an important part of the trade, whereas only six months ago it was very difficult to get a railroad company to consent to try them.

The special demand for wire nails in the West is attributed to the important figure which freight cuts in the matter of cost to the distant purchaser. The freight on nails is a very important item to the farmer living in Kansas, Nebraska, Dakota, or further West. The same price is paid for transporting 100 pounds of cut nails as that charged for an equal weight of wire nails, with the advantage to the purchaser of a much greater number of the latter than of the former, and this difference makes the wire nail actually cheaper in those distant sections than the heavy cut nail. It is possible that an attempt will be made by the steel cut nail manufacturers to produce lighter nails to compete with wire nails, but the makers of the latter do not anticipate any serious check to their growing trade from that source.

The wire-nail manufacturers deserve great credit for the energetic manner in which they have pushed the use of their product. They have not been satisfied with attempting to secure business through dealers, but they have gone directly to the consumer. Samples have even been taken to men on roofs; to farmers in the field, and to workers who use nails everywhere. A demand has thus been created upon the retailer, who in turn has applied to the jobber, who has thus been obliged to carry a stock. The present low prices are also helping to widen the use of wire nails. Consumers are thus being educated to use them, who would probably be deterred by a much higher cost, and, although profits to manufacturers may now be very small, they are certainly destined to derive much benefit in the future from this very effective popularization of the wire nail.

While intercourse between the United States and all portions of Europe has grown closer and more intimate every year, as a result of cable and steamship connections, there has been no corresponding improvement in our relations with the Central and South American governments. Mexico, there is reason to hope, forms an exception, largely attributable, however, to railroad enterprise. Of this we shall have more positive evidence when the new treaty, which took effect July 1, shall have had time for practical development. With this exception, the fact unfortunately remains that up to the present time the objects sought for in the authorization of an itinerant commission to confer personally with leading representative men in Central America and elsewhere among our Southern neighbors, known as the South American Commission, have not been attained. It is true that trade between the United States and Cisatlantic ports far down the coast toward the equator has made some progress, but nothing to correspond with our increase of population and amazing development of industrial resources, nor at all comparable to the conquests of European traders in the same field. As if to gather up and utilize the fruits of

the commission, now almost forgotten, the Washington Government proposes to carry into effect without delay the scheme for an "international parcels post," permitting a wide distribution of merchandise in certain prescribed forms and within certain limits, unrestricted by expensive charges and onerous customs regulations. Several Governments have accepted the overtures from Washington in an excellent spirit. The times are propitious, and it is not unreasonable to hope that from small beginnings there may be auspicious results—possibly the forerunner of the restoration of our merchant marine. The good work of placing samples in foreign markets should be followed up with vigor, and no effort be spared to show the appreciation of the mercantile and manufacturing classes in any endeavor to further the interests of American trade on this continent.

The decision of the Supreme Court of the United States against State taxes upon commercial travelers hailing from other States does not appear to find favor in some parts of the country. In Texas the Court of Appeals has gone so far as to sustain the local license laws, on the ground that the United States Supreme Court had overstepped its authority in construing the Constitution in the manner it did. The position thus taken by a local court borders on the ridiculous, and will not prove very embarrassing to those who seek to maintain and foster untrammelled by local laws business connections in Texas.

Custom House Reappraisements.

We have taken some pains to inquire of Collector Magone and his deputies, in the appropriate departments, respecting the methods pursued by the Custom House authorities in attempting to fix equitable rates of duty on iron and steel billets, blooms, &c. The relations of the Government officers to the importing merchants are such—so confidential in many respects, and involving in some instances the good name of reputable houses—that the officers are impelled by motives of prudence and justice alike to refrain from giving publicity to details of cases coming before them on appeals from alleged excessive valuation. For obvious reasons it becomes difficult for outsiders to obtain records of testimony taken on examination, documents submitted, &c.

It is notorious that the New York Custom House authorities for some months past have been severely critical in their examinations, pressing their inquiries with a thoroughness and pertinacity rarely known under previous administrations. It would not be strange under such circumstances if bitter complaints are sometimes heard. We are enabled to state on authority, and with some definiteness, that since January 1, 1887, there have been more appeals than before in any single year—probably as many as for two years preceding. They number not less than 50, in some of which the full advance of the appraiser has been sustained. In other cases the advance is modified, the avowed design being that the result shall depend altogether on the market value of the merchandise at the time of exportation. Nearly all the principal importers of this city have been summoned before the general appraiser at different times, some simply to testify, while others have acted as merchant appraisers auxiliary to the officers directing the investigation in hand. Foreign invoices have been subjected to the closest scrutiny, especially as to wire rods and blooms, fluctuating values being a fruitful source of grievance, real or alleged. It is needless to remark that this critical examination has caused so many appeals for reappraisal, as referred to above. Cases arise in this wise: The appraiser advances the invoice, the importer feels aggrieved and appeals. Thereupon the collector appoints a number of merchant appraisers, giving a preference to those who are most familiar with the foreign market, to sit with the general appraiser, who subpoenas before him the trade and others well informed as experts. Not unfrequently half a dozen men are thus assembled, and as a rule the case presented is disposed of without delay. At other times an adjournment becomes necessary, in order to inquire more deliberately into the evidence.

The collector and his chief deputy state that, so far as known, all the reputable importers of iron, steel and metals endeavor to make their valuations fair, although there are some who attempt to take advantage of the Government by unscrupulous means. In some instances the penalty is enforced, in some instances as high as 20 per cent. being added—in exceptional cases even more.

In rule 3 [A] of the classification of the General Committee, which we published last week, there was an important omission. This rule should read as follows: the line italicized being the one omitted: "3 [A]. The minimum carload weight upon all property in first, second and third classes shall be 20,000 pounds, and on property in lower than third class, 24,000 pounds, unless otherwise specified in the classification. In order to entitle a shipment to the carload rate, a quantity not less than the minimum carload weight must be delivered at one station, in one day, by one shipper, consigned to one consignee and destination; and only one bill of lading shall be issued for any such carload shipment."

The Acting Secretary of the Treasury has requested the Secretary of State to require certain consular officers, especially the Consul at Athens, Greece, to forward explicit information to the Department in regard to the unit of weight of iron ore in the countries whence it is exported to the United States. The Collectors at Philadelphia and Baltimore have refused to accept invoices certified by the Consul at Athens, on the ground that the weight specified thereon was not a weight of the country from which the merchandise was exported.

The Wire Rod Case.

(From Our Washington Correspondent.)

The Secretary of the Treasury having fixed August 1 as the limit of time for the responses to the arguments of Mr. Swank and others representing the American Iron and Steel Association, July 21 has been designated for a hearing by the acting secretary of the importers and others who oppose the views taken by that association. These interests will be represented by Counsel Beaman, of the New York firm of Evans, Southmayde & Choate.

The prospects of a decision favorable to the classification of small-sized rods, such as wire, are materially lessened in force by the number and character of American manufacturers who have filed communications very emphatically protesting against any change. Among those who have written here against the line of argument of the Iron and Steel Association are the following: American Screw Company, Providence, R. I.; Kraft, Gross & Co., Joliet, Ill.; Lambert & Bishop, Wire Fence Company, Joliet, Ill.; Stewart & Co., Easton, Pa.; Cincinnati Barbed Wire Fence Company, New Haven Wire Company, Omaha Barbed Wire Company, Ashley Wire Company, Peoria, Ill.; W. P. Townsend & Co., New Brighton, Pa.; Newcastle Wire and Nail Company, Pennsylvania; H. Bellmar & Co., Cincinnati, Ohio; Jere. Abbott & Co., New York City.

Mr. Beaman will represent Naylor & Co., importers, of New York. It is Assistant Secretary Maynard's purpose to reach a decision promptly after the expiration of the time allowed for the expiration and submission of replies to rod manufacturers.

Secretary Fairchild said to-day that the Department expected to have its plans perfected within the next two weeks, so that the undervaluations which have practically nullified the duties on many articles would be met by more exact methods of administration. He said, "It is not the law, but its execution which has been the cause of the irregularities. The methods resorted to in the direction of those ends have been of such long duration that they have become chronic. They seem to have taken root in the whole system and must be broken up before we can expect to make the customs laws effective in accordance with both their letter and spirit."

Assistant Secretary Maynard appears to have a more comprehensive, intelligent, and fair idea of the whole tariff subject than any one who has occupied the important office which he now holds for a long time. As he said: "I believe, even if a law is not perfect, it is better to let it alone than to be constantly agitating a change. We will give the present laws a full test by eradicating undervaluations. I believe the proper adjustment will follow if articles are subject to their proper valuation."

Secretary Fairchild is expected back in a few days. The plans which have been practically perfected to overhaul matters at New York and other custom houses will then be submitted to him for formal authority to give them application. The system of foreign agents, who are members of foreign firms, fixing valuations to suit their own schemes of fraud upon the revenues of the United States, will in all probability be broken up. Some important movements in custom-house circles and among importers may, therefore, be looked for very soon.

The Coke Strike Ended.—Our Pittsburgh correspondent telegraphs to us as follows: A delegate meeting of the Knights of Labor was held at Scottsdale yesterday at which it was unanimously resolved to return to work unconditionally and end the coke strike. It is expected that this action will be ratified by the Miners' Amalgamated Association, which is now in session in the Connellsville region, and that work will be resumed at the idle ovens as soon as possible.

A serious accident occurred in the converting department of the Union Steel Works, Chicago, on the 16th inst. While the workmen were engaged in filling ingot molds from a ladle containing Bessemer steel, an explosion suddenly occurred in the ladle, and a large quantity of the molten steel was thrown out. Eleven men were burned by the metal falling on them, of whom three have died. Some of the others are so seriously burned that their condition is very precarious. The explosion is almost unprecedented, from the fact that five ingot molds had been filled from the ladle, or about three-fourths of the entire contents, before the accident occurred. It was caused by somebody's blunder in taking the wrong ladle. The company have a sufficient number of ladles to insure their being thoroughly dried before they are used, but this one was taken out of its turn, and enough moisture remained in the lining to generate steam, which did not burst forth until the casting operation was nearly completed. The accident might have been much more terrible in its effects if the steel had been scattered over a greater space, as about 100 men were but a short distance from it when the ladle exploded.

It is reported that John H. Inman has organized a syndicate, himself taking the greater interest, and bought in one block 11,000 shares of the stock of the Tennessee Coal and Iron Company. The stock was the holding of William Duncan, of Nashville, and of Mr. Duncan's friends. It is announced that 10 of the largest and strongest holders of the Tennessee Coal and Iron stock have agreed to put their holdings in one block for five years for voting purposes, and to take so much of the stock out of Wall street entirely. These 10 holders own considerably more than a half of the company's stock; they own close to two-thirds. As an illustration of what this Tennessee Coal and Iron Company is doing, the Times quotes as under from a letter received a few days ago from an officer of the company, at Nashville: "We have sold in the last 10 days 11,000 tons of iron at better prices by 50 cents per ton than could be obtained in May and June. We have now sold for delivery 58,000 tons, and have less than 10,000 tons in our yards. Thus, you see, we have

been able to sell practically everything. Our position being so strong we have concluded to advance prices from 75 cents to \$1 a ton. Yesterday we had an inquiry for 6000 tons to be delivered first six months of next year."

Hydraulic Power in Germany.

In connection with the new harbor works at Frankfort-on-the-Main, Germany, and the improvement of the river navigation, a new central station has been provided for the railway traffic, and the arrangements for working by hydraulic power are understood to be among the foremost in magnitude yet carried out. In the excerpt minutes of the proceedings of the British Institution of Civil Engineers, we find the following particulars concerning them:

The accumulators are placed in a central tower 131 feet 3 inches in height, 46 feet in diameter, carried up in octagonal form, and situated on the right bank of the Main. The network of pipes in the station yard is about 8.7 miles in length, and the working pressure 1100 pounds per square inch. When the water, after performing its work, is not utilized for supplying engines, watering the ground or other purposes, it is brought back to the tower to be again utilized. The water supply is taken from the Main through a filter bed; a supplementary pipe also runs direct into the river. There are two suction pumps, each delivering 766 gallons per minute, and coupled with the force-pumps, by which the water is lifted to a small tank at the summit of the tower, when it gravitates to the main tank, which has a capacity of 175,200 gallons, and is constructed on Intze's system in two sections, one being always in use. In the lower part of the tower are two triple cylinder force-pumps, coupled with the piston rods of the compound engines, and delivering each 416 gallons per minute in 30 double strokes, equal to 450 horse power (indicated). Both, however, are capable of working at double speed, in case of breakdown of either, so that the highest combined power obtainable would be 1800 horsepower. The plunger of the accumulators is loaded to give a steady pressure of 1100 pounds per square inch; the diameter is 18 inches, stroke 19 feet 8 inches, and contents 31.50 cubic feet. The pipes to the accumulators are fitted with valves as a precaution against the bursting of any part of the main, when the valves would immediately close.

The largest pipes for distributing the power are 6½ inches diameter, with 1 inch thickness of metal. In winter the water passes over the condensers of the force-pumps, so that a fairly even temperature is maintained all the year round. There are 22 points for working the goods sidings, and power is supplied to the goods warehouse, coal tips, machinery in the engine sheds, and the wagon-lift from the quay-siding to the level of the central station-rails. The compact form of distributing power to all points enabled the sites for the different sheds, warehouses, &c., to be selected and laid out to the greatest advantage. About 380 H.P. is required for the electric lighting, the system comprising 200 arc-lights and about 1500 incandescent lights. Two new types of hydraulic machines are employed for this purpose; the first, Helfenberger's patent, with stroke varying automatically as the power varies (a machine of which type, erected at Herbrugg, St. Gall, has developed an effective power of 83 per cent.), and when arranged as a duplex machine, working very silently and smoothly; and the other, on Hoppe's system, working with variable water pressure. This is arranged as a triplex machine, with three cylinders set at 120° apart, working about 150 strokes per minute, and coupled with the dynamo, which therefore works at a corresponding speed. Two-thirds of the stroke is worked by direct pressure, and one-third by return-water. When not required for electric lighting there is a large amount of power available. This is in part to be applied to working the gates and machinery of the new harbor, and the remainder for supplying power to small factories in Frankfurt and Bockenheim. The harbor machinery takes 150 and the factories 230 horse-power. In the latter case the hydraulic power effects a saving of 35 per cent. as compared with gas motor, and 42 per cent. as compared with steam, gas being taken at about 70 cents per 1000 cubic feet, and water at 10 cents per 1000 gallons, the actual cost per horse-power per hour being with

Steam.....	Cents.
Gas.....	5.56
Hydraulic power.....	4.08
	2.64

The power developed by the accumulators, over and above what is thus utilized is sufficient to light all the quays by electricity.

In our review of the status of the Wheeling industries last week a serious oversight was committed by omitting to mention the fact that the Laughlin Nail Company, of Wheeling, was then, and is now, running, and claims to have made and shipped more nails during the past six months than any other nail mill in that vicinity. They report to us that their output for the six months ending July 2 was 139,641 kegs of nails.

It is stated that Col. Hain went to Altoona to examine the petroleum burning locomotive with which the Pennsylvania is experimenting there, and has ordered two of the New York Elevated locomotives to be fitted with the same apparatus. It is said also that more than a dozen methods of firing with petroleum have been tried on the Elevated in the last four years.

Twenty-six vessels carrying 30,000 tons of steel rails for the Southern Pacific are on their way out to San Francisco. The larger part of the steel is to be used in pushing to completion the northern division of the Southern Pacific system, which will give a shorter and more direct route from San Francisco to Los Angeles by the way of San Jose, San Luis Obispo and Santa Barbara.

The Stratton Separator Company, 38 Cortlandt street, New York, are putting one of their large separators on the U. S. S. Boston.

An Omission in the Scale.

On the 13th inst. the secretary of the Western Iron Association, wrote as follows to the president of the Amalgamated Association of Iron and Steel Workers:

"Sir,—Upon examining proofs of the scale we find that the clause that was in last year under the sheet scale, providing for a 10 per cent. reduction on a full turn's work, No. 17 and heavier, has been omitted from the scale.

"None of the members of our committee had noticed this omission until after the conference adjourned, nor was there one word said in the conference from your side relative to the omission.

"As we distinctly understood, and you so stated in conference, that the scale finally adopted was, so far as concerns extras, last year's scale with one or two exceptions, was distinctly understood between the two committees should be dropped or inserted, as the case might be, our committee asks that the clause shall be returned to the scale before it is published.

"In case you refuse to accede to this request, we ask a reconvening of the conference committees at the earliest date that may be most convenient to you."

In reply the following communication was received:

"Yours of the 13th inst. to hand, appertaining to the sheet mill scale on No. 17 and heavier of last year.

"You state that the members of your committee did not notice that the clause of a full turn's work of No. 17 and heavier on jobbing mills under sheet-mill scale had not been in this year's scale.

"The proposed scale of this year was given to the manufacturers on June 16, and the first conference held June 21, during which time the manufacturers, I believe, must certainly have given due consideration to the propositions made by the Amalgamated Association of Iron and Steel Workers.

"My understanding was that when the conference committee of both sides finally agreed to the scales on June 30, this year, that all workmen in the iron mills had been granted the wages as paid in 1884 and 1885, and all of our committee understood it in the same way.

"As for reconvening the conference committee, as your letter states, I have no authority of doing so, and am likewise unable to comply with your request of making the change in the scale that you desire."

Wages and Profits in the German Iron Trade.

The German Society of Iron and Steel Manufacturers has made its usual compilation on the wages and profits of that industry during the year 1886. Up to the date of the report replies had been received from 233 manufacturers of iron, foundries and machine and engine builders, the majority of them being large concerns and 94 of them stock companies. In January, 1879, these 233 employed 124,262 workmen with monthly wages of 7,681,291 marks, while in January, 1887, they had a force of 162,320 men with monthly wages of 10,740,056 marks; therefore the number of men has increased 30.6 per cent. and the monthly wages 39.86 per cent. This in January, 1879, made the average wages per man 61.83 marks, while in January, 1887, it was 66.17 marks. The 94 stock companies allotted to, according to their published reports, had in 1879 a share capital of 337,689,613 marks and showed a profit of 7,261,895 marks, or equal to 2.15 per cent. In 1885-86 their stock amounted to 353,946,684 with net earnings of 13,955,569 marks, equal to 3.94 per cent. on their capital invested. Out of the 233 works cited only 47 have less than 100 men, while 39 of them have each 1000 or thousands of workmen in their employ. According to the figures published for the first time in connection with the Accident Insurance scheme introduced recently in Germany, the average wages during the year 1885 were 87.6 marks in the iron and steel works of the Rhenish and Westphalian provinces, while they were 85.6 marks in the engine works, machine shops and hardware manufacturers.

The fifteenth volume of the Transactions of the American Institute of Mining Engineers has just been issued.

Col. Jerry Andrews, who succeeds Capt. Eads as chief superintendent of the Tehuantepec Ship Railway Company, has just returned from a prolonged absence in Mexico, and earnestly favors the prosecution of that enterprise which will call for the expenditure of \$60,000,000. The road will be 132 miles long. Respecting the advantage to be gained Col. Andrews says: We have 4000 miles the start of England and much more than that of Germany, and with this advantage we could beat the ships of any country on earth into the lands of the Pacific. We must, as things are now in the ship building trade, depend upon our clipper-built vessels to do even business. There are no match for the English steamships in matters of speed when the Horn has to be doubled. Thus at one swoop we restore our commercial interests and find a vent, if you please, for our manufactured products, which are being stacked up in the warehouses of the East. We get in return the raw products of these semi-civilized countries and these will furnish us with other means of money making. Capt. Eads left nothing but the construction to be looked after, and this we must provide for. It is said a ship weighing 5000 or 6000 tons cannot be thus transported. Why, I lowered a pier of the St. Louis bridge, weighing 42,000 tons, as easily as I could raise a pound weight, and this thing is much easier of performance and much more practicable than the other.

The New Jersey State Board of Education authorized the State Superintendent to make an investigation of the subject of industrial education as now applied to the educational system of other States. The trustees of the State Normal School subsequently met and appointed a committee to consider the advisability of a course of industrial studies in the school.

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whereupon the Supreme Court and the Merchants' Association decided against the opinion that McClelland's name, but not his sound, was a measure of his worth. The trustee of the estate, however, had an interest in his own name, and as McClelland's payment of the debt was better proof of his worth than his own, the trustee had been swayed by the precedent of the eighteenth century and sufficient to discharge the debt. The contract was not one of the many others of the same kind that the merchant had signed. McClelland's dinner had been ordered to him, and he was to be supplied with food. There is nothing in the instrument, of

Latest Legal Decisions.

DRAFT—FRAUDULENT REPRESENTATIONS.

A private banking association, which was not incorporated, cashed a draft made by one Orvin Skinner on Cummings & Co., of New York, upon the fraudulent representations of Skinner. It was returned unpaid, and McClelland, the cashier of the banking house, meeting Skinner, prevailed upon him to pay the amount given to him. This payment was made by a draft of the Merchants' Bank on its correspondent in New York, which Skinner had obtained from it by false statement in payment of his draft on Cummings & Co. Before the draft was presented for payment in New York, the Merchants' bank had learned Skinner's character, and had instructed its correspondent to refuse payment, which was done. McClelland then brought suit in his own name against the maker and obtained judgment,

assignment, to notify the assignee that the instrument was originally given upon an illegal consideration (gambling debts excepted), or obtained through fraud, the assignee who pays value therefor, and takes the same in good faith before maturity, may recover, as against the maker. This is true, even though such an assignee be in possession of facts or circumstances sufficient to arouse suspicion in the mind of a person of ordinary prudence, and though he is guilty of negligence in not following up such information for the purpose of discovering the fraud or illegality to which the suspicious circumstances may seem to point."

SUBSCRIPTION TO STOCK—PAYMENT IN VALUES—INSOLVENCY OF CORPORATION—RECEIVER'S CLAIM FOR DEFICIENCY IN VALUE.

Unthank & Coffin were a partnership engaged in making plows, and they formed, with others, a stock corporation, the Unthank Plow Company. Coffin, to paying for

but if there was no fraud or concealment when the transaction in question was consummated, it is not perceived how the creditors were defrauded by reason of an overvaluation of the property which was turned over in payment of the stock any more than they would have been if the subscribers had paid in cash for the stock, and the corporation had then invested the money in patents and other property, which could now be shown were purchased at a price in excess of their value."

FIRE INSURANCE.

J. sued to recover upon his fire policy, and the company set up the defense that he had fired his property with intent to defraud the company. Upon the trial the Court charged, at the request of the plaintiff, that, as this defense, in effect, was a charge of arson, it must be established, as a crime charged, must be established, beyond a reasonable doubt. The plaintiff had a verdict and

he entered against him, with a certain attorney's fee, if he failed to pay it. The suit was brought on April 20, 1885, and on the same day an attorney at law appeared for all of the defendants, indorsers as well as the maker and confessed judgment for the amount due with the attorney's fee, as stated. Judgment was entered in conformity to the confession, and the indorsers moved for a new trial, which was denied to them, and they appealed to the Supreme Court of Texas, where the judgment was reversed. The Chief Justice, Wallie, in the opinion, said: "Upon the face of the note, no power is given to confess judgment against any one except the maker. W. need not inquire as to whether this power would embrace others who signed the note before delivery, for the legal presumption is that the present indorser did not so sign. It is claimed that the indorsements were made before delivery, but that cannot be shown by parol proof, the only proof plaintiff had; because a

the attorney or take a rule upon him. In the latter case the court will compel immediate justice or inflict summary punishment on the attorney if the sum retained by him be such as to show a fraudulent intent. But if he appears to have acted in good faith and claims only what he honestly thinks is a fair compensation, the client will be sent to a jury to find his rights. W. here argues that, as the jury has found that the money is due to her, the court should compel the payment by summary process, but this cannot be done. By going to a jury she has waived her right to a rule upon B. By obtaining the judgment, W. has put herself in the position of B's creditor, and he must respond as her judgment directs. He is no longer before the court simply as its officer, who, as such, must obey its order or be punished."

Luermann on Blast-Furnace Lines.

In *Stahl und Eisen*, F. W. Luermann, the well-known German metallurgist, after considering the conditions governing the descent of the materials forming the charge in blast furnaces for boshes of different degrees of inclination, notices the section proposed by Mr. E. Walsh at the St. Louis meeting of the American Institute of Mining Engineers in 1886, as likely to promote the regular and rapid working of a furnace. This consists of a tall, very slightly coned, stack, with a broad hearth and steep boshes (75°), which are so low that the widest part of the furnace being within the zone of fusion, no accretion of material leading to scaffolding can take place. Luermann thinks that this section, which is substantially similar to that proposed by Stahlschmidt in 1864, may be improved by omitting the boshes entirely, as in practice they are soon melted away, and the lower part of the furnace becomes substantially cylindrical. In illustration of this opinion a furnace was built and blown in at Müsen in August, 1885, and kept in blast until December, 1886. The furnace, of 31 feet 8 inches total height, is 3 feet 9 inches broad at the throat and 4 feet 1½ inches at the bottom. The lower part of the stack is cylindrical for 4 feet 2 inches, and above that level is slightly conical, the slope of the side being about 9° from the vertical; the cubical content is 353 cubic feet. During a blast lasting 460 days, the total make was 2781.4 tons of pig iron, or an average of about 6 tons in 24 hours, so that the effective volume per ton of daily make was only 59 cubic feet as compared with 166 cubic feet in the larger German coke furnaces,

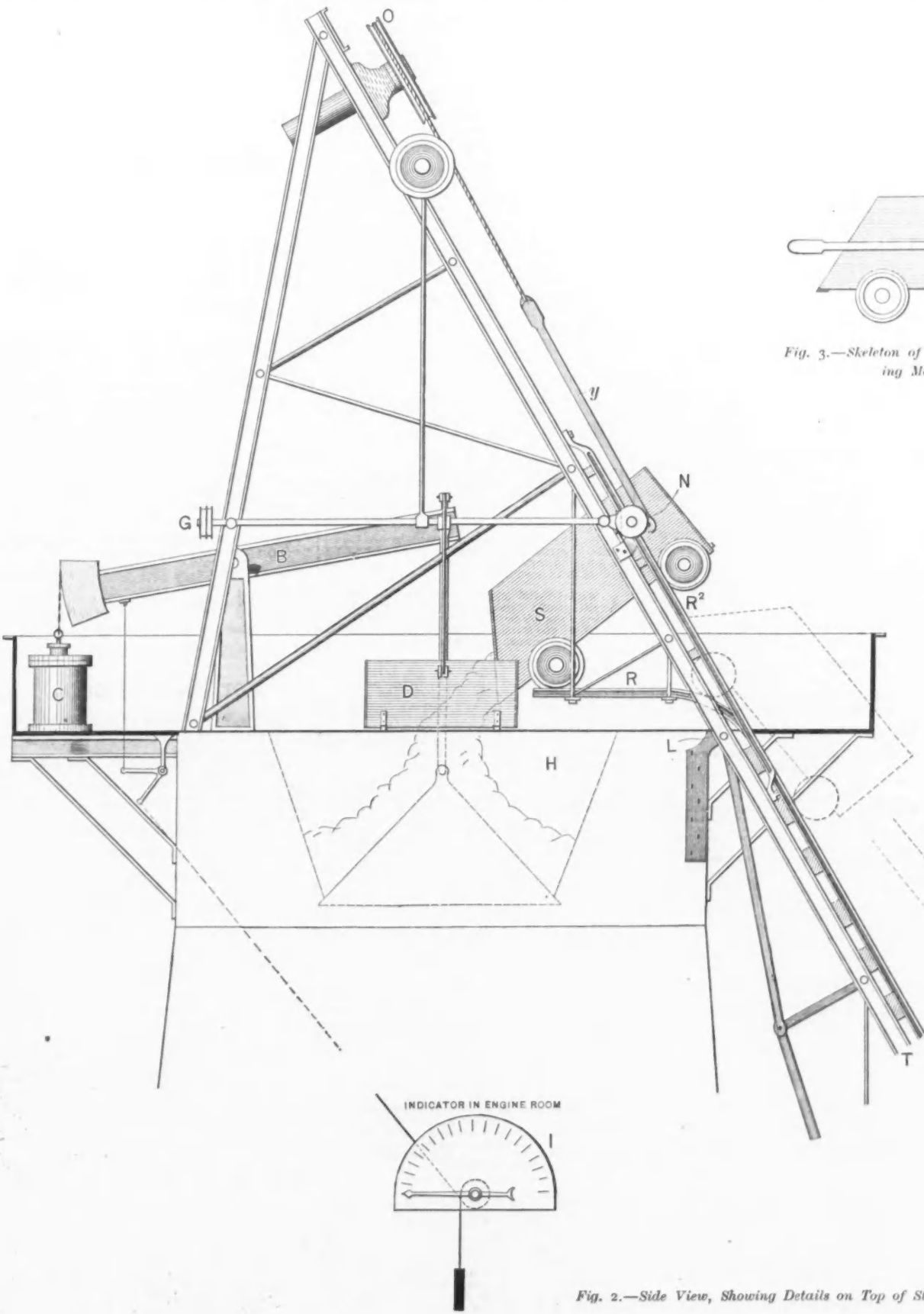


Fig. 2.—Side View, Showing Details on Top of Stack.

(For description see page 1.)

THE FAYETTE BROWN FURNACE HOIST, AT THE RIVERSIDE IRON WORKS, STEUBENVILLE, OHIO.

whereupon the defendant appealed to the Supreme Court of Colorado, where the case—*Merchants' Bank vs. McClelland*—was again decided against the bank. Judge Helm, in the opinion, said: "1. The bank contends that McClelland could not sue in his own name, but we do not consider this contention sound. The banking concern, of which he was a member and the cashier, and its business was conducted by him and he was acting in a trust capacity, so that he was the trustee of an express trust. As such a trustee, he could, though not the real party in interest, maintain a suit upon the draft in his own name. 2. It is further contended that as McClelland had taken this draft in payment of an antecedent debt, he was in no better position than the bank which had been swindled by Skinner, but an antecedent debt is now by the decided weight of authority held to be a good and sufficient consideration for the delivery to the debtor of a negotiable instrument. The contrary is held in New York, Maine and some other States, but they are outweighed in the matter. 3. The contention that McClelland had good reason to doubt that Skinner had lawful title to the draft he delivered to him in payment of his claim cannot be supported under the decision. If there is nothing upon the face of a negotiable instrument, or in the written indorsement or

the shares subscribed for by him, turned over to the company his interest in certain patent rights and assets of Unthank & Coffin, at a valuation sufficient to pay subscription in full. The company became insolvent, and the receiver, by direction of the court, appointing him, sued Coffin to recover the difference between the estimated and actual value of the property given by him in payment for his stock. In this case the receiver recovered his demand, but on the appeal—*Coffin vs. Ranshell*—the Supreme Court of Indiana reversed the judgment. Elliott, C. J., in the opinion, said: "1. Any payment for stock, whether it be in money or in money's worth, so that it be made in good faith, will give the shares so paid for the condition of paid-up stock. If a man contracts to take shares he must pay for them, to use a homely phrase, in meal or in malt. He must pay in money or in money's worth. If he pays in one or the other that will be a satisfaction. Even in case of an overvaluation of property transferred to a corporation in payment of shares, the transaction, unless void for some reason, is binding, so long as it is not impeached by the corporation or its assignee, and it can be impeached only for fraud on the corporation. The receiver argues that acting for the condition he is entitled to recover for the overvaluation of the property put in for the defendant's stock,

judgment, and defendant appealed to the Supreme Court of Indiana, where the case—*Continental Insurance Company vs. Jachnick*—was reversed. Judge Mitchell, in the opinion, said: "some of the test writers and several of the earlier reported cases approve of the plaintiff's contention here, but, so far as we have observed, all of the courts so deciding have receded from their determination. It may, therefore, be considered as established that in civil actions of this class the rights of the parties are to be determined by a preponderance only of the evidence. Being a civil action, it is subject to all of the rules which belong to actions of that class without regard to the fact that the matter in issue may involve the imputation of a crime. This applies as well to the admissibility of evidence in respect to the character of the parties as to all the other distinctions between civil and criminal actions. The Court erred in charging the jury, and the case must go back for trial that the defendant may make out his defense by a preponderance of evidence only."

NEGOTIABLE INSTRUMENTS—AUTHORITY TO CONFESS JUDGMENT.

W., the maker of a note for \$12,500, and four indorsers thereon were sued upon it by the holder, it being in default. In the note the maker stipulated that judgment might

written instrument cannot be varied to change its term, as would be done here to give this note the effect it is sought to be given to it. The indorser undertakes that the maker shall perform any engagement contained in the note; he contracts that the maker shall pay principal, interest and attorney's fees at the time and place stated in the note, but this agreement is coupled with a condition that the note shall be protested and notice given him, or that suit shall be brought against the maker within a reasonable time. He gives his indorser no right to take a judgment against him because he has become responsible for the default of another who has authorized a summary proceeding against himself."

ATTORNEY AND CLIENT.

B., as attorney, collected a claim for W., and he refused to pay the amount got unless a certain fee was allowed him. W. then obtained judgment against him, and he paid something more than he insisted he should pay, but leaving part of judgment still unpaid. W. then applied to the Supreme Court of Rhode Island for a summary order upon B. to pay the balance of the judgment, but the application was dismissed. Judge Stiness, in the opinion, said: "If the client is dissatisfied with the sum retained by his attorney he may either bring suit against

and 350 cubic feet and upward in those of the Middlesboro' district. The consumption of charcoal was at the rate of 22½ cwt. per ton of iron made from a mixture containing 46.9 per cent. of iron. The make was principally gray, mottled, and white charcoal iron of the highest quality for use in making chilled rolls and malleable castings. After blowing out, the sides were found to be burnt out to a considerable extent in the region of the hearth and tuyeres, showing that there is no tendency to the formation of scaffolds in these parts, and, therefore, that the boshes recommended by Stahlschmidt and Walsh are unnecessary."

We have received from the Haxton Steam Heater Company, Kewanee, Ill., a copy of the current catalogue of the company devoted to steam-heating materials. The book is a pamphlet of some 50 pages and gives general views of the Haxton improved low-pressure vertical base burning boiler for steam heating. Modified forms also are shown adapted for different positions, and for the use of different kinds of fuel.

Otto gas engines coupled to dynamos are now put on the market in England. They are fitted on one bed and form a very compact arrangement.

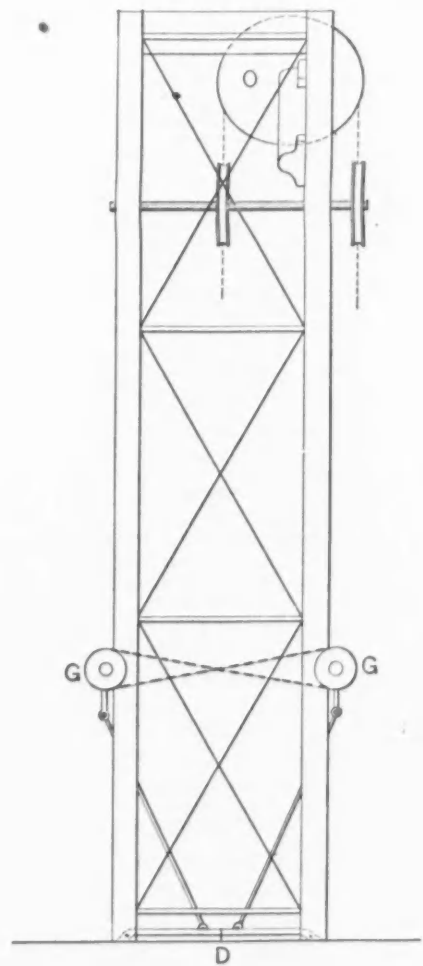


Fig. 4.—End View.

Special Notices.

BUSINESS OPPORTUNITIES.

BUFFALO, N. Y.

The Board of Managers of the Business Men's Association of the City of Buffalo invite the attention of Capitalists, Manufacturers and Business Men generally to the unusual advantages of Buffalo as a manufacturing and distributing point. Parties interested in statistical evidence which will prove the claims of our City as to possessing very superior advantages in facilities for transportation, cheap fuel, low taxes and an exceptionally thrifty, capable and non-striking industrial population and other substantial inducements, are invited to correspond with this Association.

Edmund Hayes, John C. Graves,
Ralph Plumb, George W. Francis,
Charles A. Gould, Walter J. Shepard,
George P. Sawyer, George W. Miller,
C. W. Hammond, James Crute,
George H. Lewis, T. Guilford Smith,
Stephen F. Sherman, Thomas Hodgson,
Daniel O'Day, Edward H. Fowler,
Wm. H. Johnson, Joseph P. Dudley,
John H. Smith, Henry C. French,
H. E. Follinsbee, Henry Koons,
George D. Briggs, John Satterfield,

Millard F. Windsor,

JAS. B. STAFFORD, President.

WM. HENGERER, 1st Vice President.

R. R. HEFFORD, 2d " "

R. K. NOYE, 3d " "

JOHN L. WILLIAMS, Treasurer.

ATTENTION,

Capitalist - and - Foundryman.

An Incorporated Company offers for sale State Rights to manufacture, and sell a valuable Patent Boiler (for house-heating). Hundreds in successful operation, which can be referred to for full particulars.

Address Box 1006,

WORCESTER, MASS.

New England States reserved.

FOR SALE.

THE MACHINE SHOP AND FOUNDRY

with six acres of land, now occupied by

THE STILES & PARKER PRESS CO.,

situated in the city of Middletown, on the Connecticut Valley Railroad. This is the only Jobbing Machine Shop and Foundry on the Connecticut Valley Railroad and the surrounding towns. It has the patronage of most of the surrounding towns, possessing good facilities for freighting by the Connecticut River and three railroads. Proposing to remove our business from the city, we will sell this property at a reasonable price, and part payment may be made in cash. Possession given about October 1st. Apply on the premises, or by letter to

N. C. STILES, Treasurer.

VALUABLE IRON MINE FOR SALE.

This property covers an area of 300 acres and exhibits at various points an Ore giving 66 per cent. of Iron-furnace best—no sulphur or phosphorus. The property is situated within 10 miles of Ottawa and is most favorably placed for mining operations. The highest reports upon the property have been received from first-class experts. Title perfect. The new Canadian Iron tariff makes this a most valuable property. Samples of the Ore and further particulars can be obtained by applying to the Manager—Ontario Bank Ottawa, Canada.

FINE BUSINESS CHANCE.

FOR SALE, an established HARDWARE, TIN, QUEENSWARE and TOY BUSINESS of five years' standing, in one of the best towns on the Texas and Pacific R.R., 230 miles West of Fort Worth, Texas, in the heart of the cattle and sheep district of the State of Texas, with a population of 3000, and growing every year; stock about \$5000, all fresh and new. For particulars, address GEO. MILLER, Colorado, Texas.

FOR SALE.

A rare chance to buy a clean and well-assorted stock of

HARDWARE, STOVES & TINWARE

in one of the best towns in Michigan. Stock will invoice \$5000. The best of reasons for selling. Address "JAP," office of The Iron Age, 66 and 68 Duane St., N. Y.

FOR SALE, a large and well-sorted stock of HARDWARE.

A long-established and profitable business at the old hardware stand, No. 207 Main Street, Jamestown, N. Y. Advantageous lease of store extending to May 1, 1891. Business includes several valuable specialties. The entire business will be sold at a bargain. Complete inventory ready for inspection. For particulars, address A. FRANK JENKS, Administrator of the estate of D. C. Packus, Jamestown, N. Y.

FOR SALE—A clean stock of GENERAL HARDWARE that will invoice \$5000 and over; located in one of the best, neatest and cleanest towns in Ohio, with a good trade, and for 12 years in the same town; low rent; we have not sold tin and stoves, nor implements, with these added, sales would reach from \$5000 upward; terms of sale, cash, or as good in bankable paper; no real estate taken. For particulars, address STULL & CHARLES, Ashland, Ohio.

FOR SALE.

HARDWARE BUSINESS

In Grand Rapids, Mich., a live city of 60,000 inhabitants; old stand; choice location; stock in good condition and closely bought; will invoice \$5000 to \$10,000; will sell at discount to cash buyer. Address

"HARDWARE," Box 532,

Grand Rapids, Mich.

FOR SALE.

A GOOD CLEAN HARDWARE STOCK.

In a town of four thousand inhabitants in Southern Dakota; annual sales, \$25,000. This is a rare chance and will bear investigation. Cause of selling, death in family. Adress

"LOCK BOX 178,"

Mitchell, Dak.

Alabama's Mineral Belt.

Parties wishing information about, or investment in, Alabama Mineral, Lumber or Agricultural lands, will please address, with stamp,

EDWARDS & ARNOLD,

Talladega, Ala.

Special Notices.

BUSINESS OPPORTUNITIES.

FOR SALE.

THE MELVIN SEWING MACHINE CO.'S FACTORY AND GROUNDS.

located in Chillicothe, Ross Co., Ohio, and adjoining the depot grounds of the C. W. & B. and Scioto Valley Railroads. The main building is of brick, 133 x 33 feet; three stories, slate roof, well-lighted and floors 6 in. thick. The Engine, Boiler and Japan rooms and Blacksmith shop are all of brick and covered with tin. The whole building heated by steam and lighted by electricity. It contains a 45 horse-power Reynolds-Corless Engine, a 75 horse-power Babcock & Wilcox Boiler and Edison Dynamo, all in good condition. One house and lot and three vacant lots, all adjoining the factory grounds. This is a desirable property for manufacturing purposes, and will be sold at a bargain. For further particulars call on or address

NELSON PURDUM, Receiver,

Chillicothe, Ohio.

AN OPPORTUNITY FOR MANUFACTURERS.

The very best advantages for new manufacturing enterprises in the South are offered by the

GATE CITY LAND COMPANY.

Birmingham, Alabama. The Company's property lies just out of the city of Birmingham, and is traversed by four of the trunk railroads running into the city. It possesses the general advantages of the Birmingham district, including a fine deposit of red hematite iron ore and large quarries of lime rock and building stone. One of its notable peculiar advantages is a pure white glass sand, pronounced by a Northern authority the finest of the kind in the country; while a variety of other sands of lower grade are found on the lands. The latter also have exceptional advantages for a paint mill. The recent large investment of Northern capital in Birmingham in furnace property has been taken as conclusive testimony to the splendid advantages of the place for making pig iron. It has twenty furnaces in operation or building; also, in operation, a large rolling mill stove works, cast pipe works, foundries and machine shops and a variety of other iron working enterprises. There are now located on the Gate City property a rolling mill, iron safe works, a tannery and several smaller enterprises. The company is now ready to correspond with other manufacturers who may wish to locate in the South, and share in its new prosperity. Every enterprise about Birmingham has all the business it can do. There is room for new concerns in all lines, and the undersigned has eligible manufacturing and residence sites to offer to all.

ROBT. WARNOCK.

FOR SALE OR TO LEASE.

at Perth Amboy, New Jersey, adjoining wharves of the Lehigh Valley R.R. (to water), and admitting largest ocean steamships without obstruction of any kind, 1200 feet dock front by 4000 feet in depth. This property is crossed by the Lehigh Valley Railroad, the Pennsylvania Railroad, the Central R.R. of New Jersey, and the Erie Railroad, and is on the line of the Delaware and Raritan Canal Towing Line. Thirty feet of water in front of property, and three Railroads, Lehigh Valley, N. J. Central and Pennsylvania, all crossing the tract. See map on page 41. Address

WILLIAM T. MEREDITH,

No. 48 Wall St., New York.

AN ACTIVE YOUNG MAN with long experience in New York wholesale hardware house, having a few thousand dollars, would invest same with services in hardware or kindred business, wholesale preferred. Highest references given. State full particulars in confidence. "MILTON," Box 101, office of The Iron Age, 66 and 68 Duane St., N. Y.

WANTED—PARTNER WITH CAPITAL, to go into the Foundry business. Excellent facilities and location. Address for full particulars "LOCATI," N.

Office of The Iron Age, 66 and 68 Duane St., N. Y.

TO LEASE—A VERY ADVANTAGEOUS LOCATION FOR A PIPE OR

GENERAL FOUNDRY.

Water power and buildings ready for use; near New York. Excellent transportation facilities to all large towns and cities. Address

"PIPE,"

Office of The Iron Age, 66 and 68 Duane St., N. Y.

FURNACE FOR SALE.

A good Charcoal Iron Furnace in Michigan. For particulars, inquire of E. C. Feltz, 11-12 Wade Building, Cleveland, Ohio.

FOR SALE—Stock of Iron, Steel, Wagon and Car material, both new and old; also, large, convenient Store Room, located in growing manufacturing and now booming city of Quincy, Ill., the second city in the State, and on a branch of the Illinois River, excellent traveling territory on every side; for fine, rich country scarcely equalled. Business established twenty years. Money made every year. The only store of the kind in the city. Reason for retiring, bad health.

LEMLEY BROTHERS,

Quincy, Illinois.

ARE OPPORTUNITY—A first-class MALLEABLE IRON WORKS located in the City of Rome, N. Y., for sale at half its value.

A. ETHRIDGE, Rome, N. Y.

FOR SALE.

At GREENWOOD, OHIO, on C. & A. R. R., in one of the finest farming cities Northwest, O., a General Hardware and Grocery store, with entire stock of goods; a fine residence with wood dwelling house and ornamental trees; fine fruit; fine well of water and clean; 2 acre lot; good stable and outbuilding; a good place to live and good trade; all clear of debts; at bargain ever offered; will double in 10 years; worth \$7000 to a lively business man. J. C. HORNE, Wren P. O., Ohio.

\$5000. THREE PATENTS.

No. 281,141, July 13, 1882, Flexible Pipe Joint. No. 282,355, Aug. 22, 1882, Stop Cocks. No. 289,066, Nov. 23, 1882, " "

These patents have never been operated, the inventor and holder now in different line will sell them for the amount named, or will arrange liberally with any party having facilities for and willing to undertake their development. Address

"PATENTEE,"

Office of The Iron Age, 66 and 68 Duane St., N. Y.

FOR SALE.

In consequence of the physical disability of the only active partner a clean and well-assorted stock of

HARDWARE

with a large, paying custom. City of 15,000 inhabitants surrounded by the richest farming country in the West and a railroad center. This is a business opportunity and bargain not often found.

Address "SELLER,"

The Iron Age, 66 and 68 Duane St., Chicago, Ill.

WANTED TO SELL, the leading HARDWARE BUSINESS OF DENVER, CO., located in the heart of the city; good fixtures and one of the best-equipped stocks in Colorado. For further particulars, address No. 3300 Jay St., Denver, Col.

Special Notices.

BUSINESS OPPORTUNITIES.

TO CAPITALISTS.

The Proprietor of an Extensive Machine Works, Foundry, &c., located at one of the most enterprising, prosperous and healthy cities in North Georgia, desires to correspond with a party with capital, with a view to a business arrangement. These works command a large trade, have several valuable specialties, and have now contracts on hand even beyond their capacity, and daily refusing orders and contracts amounting to thousands of dollars. The Proprietor desires to increase the capacity of the works, so as to do all the work offered, but lacking capital, therefore, would be pleased to communicate with a party with means with whom a favorable arrangement would be made. Address "PROGRESS," Office of The Iron Age, 66 and 68 Duane St., N. Y.

FOR SALE, OR TO LET, at Whitesboro, L. I., a large factory property, covering 25 to city lots, with a frontage on three streets; convenient for water or railroad transportation. Extra inducements offered by the Long Island R. R., including a switch directly into the works. The buildings are of brick, substantially built, three stories high, with plenty of light and air. The engine, boiler, shafting and gas machine are all in perfect order, and ready to start at a moment's notice. The location is healthy, and plenty of help can be obtained from the surrounding country. Time, one hour from New York City. Full description, with diagram, furnished on application. Address

J. C. MILLIGAN,

19 Cliff St., New York.

BUSINESS FOR SALE.

In one of the largest Western cities; chiefly cutlery; established twenty-five years; must sell on account of ill health; capital required about forty thousand dollars; possession January 1st next, or sooner if required. For further particulars, address

"FAXON," Box 101.

Office of The Iron Age, 66 and 68 Duane St., N. Y.

HARDWARE BUSINESS FOR SALE.

Splendid opportunity; best location in Central New York; established nearly fifty years ago; stock will be sold at a bargain. Address

"HARDWARE," Box 919.

Office of The Iron Age, 66 and 68 Duane St., N. Y.

FOR SALE AT A BARGAIN.

A clean and complete stock of

HARDWARE

in Northern Michigan. About \$12,000. Address

"HARDWARE STOCK,"

Office of The Iron Age, 66 and 68 Duane Street, N. Y.

FOR SALE—MILL PLANT AND MACHINERY.

Bids will be received until August 10th, 1887, inclusive, for the Mill Plant of the Dean Woolen Company, at Newark, Del., consisting of about ten acres of land, an estimated fifty-horse-power, a brick house building, 80x50 ft., thoroughly equipped, in first-class condition, etc. Bids will also be received for 250 tons, more or less of Woolen Machinery recently injured by fire. For information and circulars in regard to both, apply to

DEAN WOOLEN CO., Newark, Del.

Aluminum, "the Metal of the Future."

The Only Treatise in the English Language.

Aluminum: Its History, Occurrence, Properties, Metallurgy and Applications, including its Alloy. By Joseph W. Richards, A. C. Chemist and Practical Metallurgist. Member of the Deutsche Chemische Gesellschaft. Illustrated by 16 engravings, 12 mo., 350 pages. Price, \$2.50, free of postage to any address in the World. Contents: Part I. History of Aluminum. II. Occurrence of Aluminum in Nature. III. Physical Properties of Aluminum. IV. Chemical Properties of Aluminum. V. Metallurgy of Aluminum. VI. The Manufacture of Aluminum. VII. Manufacture of Aluminum. VIII. Manufacture of Double Chloride of Aluminum and Sodium. IX. Manufacture of Aluminum. X. Manufacture of Aluminum. XI. Working of Aluminum. XII. Alloys of Aluminum. Appendix. Addenda. Index.

A circular showing the full table of contents of this volume will be sent free of postage, to any one in any part of the world who will furnish us with his address.

HENRY CAREY BAIRD & CO.

Industrial Publishers, Booksellers and Importers,

810 Walnut St., Philadelphia, Pa., U. S. A.

METALLURGICAL ENGINEERING.

We are prepared to furnish

PLANS, SPECIFICATIONS

AND

ESTIMATES

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SUPERINTEND THE CONSTRUCTION OF ROLLING MILLS AND MACHINERY, REGENERATIVE GAS FURNACES,

TUBE AND PIPE MILLS,

ETC., ETC.

We represent the latest improvements in all the above branches.

SMITH & LAUGHLIN, Successors to M. V. Smith,

Metallurgical Engineer,

Rooms 16, 17 and 18 Bissell Block, Pittsburgh, Pa.

STEEL RAILS.

The Springfield Iron Company

are now ready to take contracts for all standard weights for delivery in July and later.

Works and General Offices,

SPRINGFIELD, ILLINOIS.

Chicago Office, 115 Dearborn St.

EUGENE BISSELL, Auctioneer.

HAYDOCK & BISSELL,

Successors to

ROBERT R. HAYDOCK & CO., and E. BISSELL & CO.

WHOLESALE

HARDWARE AUCTIONEERS,

12 Murray St. and 15 Park Place, N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

TO SELL AT A BARGAIN, ten miles of 37-lb. Steel Rail with chair fastenings, in excellent condition, and new spikes for same. Address

T. H. MCKAW & CO.,

Fortsmouth, Mich.

Special Notices.

HELP WANTED.

Undisplayed Advertisements for Help Wanted not exceeding fifty words One Dollar each insertion. Additional words two cents each.

A PRACTICAL MACHINERY MAN as Salesman, Buyer and Traveler for a machinery house; one acquainted with the trade desired. Address "N. Y." Office of The Iron Age, 66 and 68 Duane Street, New York.

HARDWARE PACKER WANTED in a wholesale house; one who is thoroughly experienced in the business; references required; permanent situation to the right man. SMITH, LYON & FIELD, 130 Duane, and 62, 64 and 66 Thomas Streets, New York.

HARDWARE SALESMAN, traveling South or West, to sell Leather and findings on commission. Address "LEATHER," Lock Box 1086, Philadelphia.

A FIRST-CLASS TINNER; one who thoroughly understands fitting malleable iron castings; give age and salary expected. UNITED STATES STORE SERVICE CO., 71 Trinity Place, Albany, N. Y.

FIRST-CLASS MAN who is competent to take charge of an Open Hearth and Bessemer steel plant. Address, stating age, education, experience and salary desired, "BESSEMER," office of The Iron Age, 66 and 68 Duane St., N. Y.

A GOOD, RELIABLE, STEADY MAN, who thoroughly understands working heavy and light sheet iron, to take charge of a water and well PIPE MANUFACTORY; also three good sheet iron workers. Address "P. O. DRAWER 1979," Los Angeles, Cal.

TRAVELER TO SELL TABLE AND POCKET CUTLERY to the retail trade in the Eastern States on commission; also one each for New York State, Pennsylvania, Ohio, Indiana and Michigan; only those need answer who have an established trade and who wish to add above goods to their line. Address "CUTLERY," Box 279, Office of The Iron Age, 66 and 68 Duane St., New York.

SITUATIONS WANTED.

Undisplayed Advertisements for Situations Wanted not exceeding fifty words Fifty Cents each insertion. Additional words one cent each.

A BESSEMER MAN of ten years' experience in the manufacture of all kinds of steel, desires an engagement as MANAGER, or as holding a present position as manager, but desire to change locality; best reference can be given. Address "MAKER," Office of The Iron Age, 66 and 68 Duane Street, New York.

BY A YOUNG MAN, position as CLERK in HARDWARE STORE, 8 years' experience; best of references. Address J. W. APGAR, 271 Henderson St., Jersey City, N. J.

A MARRIED MAN, 26 years of age, who has had 10 years' experience in the hardware trade, wants a situation as TRAVELING SALESMAN for a hardware house. Address "S," Lock Box 40, Trumansburg, N. Y.

A MAN OF EXPERIENCE IN MANUFACTURING would like to investigate any business requiring the services of a competent SUPERINTENDENT and Manager. Address C. C. THORNE, 631 Carlton Avenue, Brooklyn, N. Y.

MECHANICAL ENGINEER OF LONG EXPERIENCE, competent to design, construct and superintend building of engines and machinery of any kind and for any purpose, is open for re-engagement. Preferred with parties that will take interest in and introduce valuable patent invention wanted on all kinds of engines, compressors, &c. Address "M. E.," office of The Iron Age, 66 and 68 Duane St., N. Y.

A STRONG LAD of 17, who resides with his parents, and speaks and writes English, German and French, desires a situation as STOCK BOY in a wholesale hardware store, where he would have an opportunity to learn the business and work his way up. Refers to present employers with whom he has been 13 months. Salary no object. Address "C. T. H.," P. O. Box 546, New York City.

MECHANICAL ENGINEER, thoroughly competent, with theoretical knowledge and extensive practical experience in Drafting, Estimating and Constructing various kinds of Land and Marine Engines and Boilers, Millwork and Machinery, Structural work, Hydraulic Work, &c. Also the building of Mills, Factories, &c., desires an engagement. Address "P. T.," Office of The Iron Age, 66 and 68 Duane St., New York.

A METALLURGICAL CHEMIST, with many years' experience in this country and in Europe, desires a position in Philadelphia or New York or vicinity. Iron and Steel a specialty. Please address "CHEMIST," Lock Box 1086, Philadelphia, Pa.

MECHANICAL DRAFTSMAN, practical and theoretical, of large experience on general work, special machinery, etc., practical man in all details of shop, well posted in modern shop practice, wishes position preferably where part service can be rendered as superintendent or salesman. Address "P. T.," Office of The Iron Age, 66 and 68 Duane St., New York.

A SALESMAN, thoroughly posted in HARDWARE and IRON, and personally acquainted with the hardware trade, boiler makers and machine shops in the States and Council Bluffs, Iowa; Omaha and Lincoln, Neb.; Kansas City, St. Joseph, Sedalia and Springfield, Mo.; Atchison, Leavenworth, Lawrence, Topeka, Fort Scott and Wichita, Kan., wishes lines of Hardware, Iron, Tools, &c., on commission, visiting the above mentioned cities every sixty days and making headquarters in Kansas City. Address "BOX 112," Station A, Kansas City, Mo.

A GENTLEMAN who has had an extensive business experience and who possesses business abilities of a high order, would like to make an arrangement to take charge of a Chicago Agency for some first-class Eastern manufacturing firm. Best of references, both East and West. Address "H. T.," Office of The Iron Age, 66 and 68 Duane Street, New York.

ESTIMATES FOR RIDDLE RIMS FURNISHED. Address, stating sizes and quantity,

JOHN BROWER,

P. O. Box 1423,

New York.

GRAPHITE

(sometimes called black-lead or plumbago) for a lubricant must be pure; to be pure must be "floats." Ask for Dixon's Dry American Graphite, or address

JOS. DIXON CRUCIBLE CO.,

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PRICE BOOKS.

LARGE SIZE, 500 Pages, 5 x 9 1/2 in., each, \$8.00.

POCKET SIZE, 250 Pages, 4 x 7 in., each, \$4.00.

Send for Circulars.

B. LAMBERSON,

PORTLAND, OREGON.

Special Notices.

MACHINERY.

BARGAINS.

4 5/8 x 6 Vertical Engines, New

Special Notices.

MACHINERY

IRON WORKERS' MACHINERY

One 46-in. x 12 ft. Horizontal Boring Mill.
 One 30-in. x 12 ft. Engine Lathe.
 One 30-in. x 16 ft. " "
 One 26-in. x 12 ft. " "
 One 22-in. x 8 ft. " "
 One 20-in. x 10 ft. " "
 One 18-in. x 8 ft. " "
 One 16-in. x 10 ft. " "
 One 16-in. x 8 ft. " "
 One 15-in. x 6 ft. " "
 One 14-in. x 6 ft. " "
 One 10-in. Bench Lathe.
 One 10-in. " " " long legs.
 One 5-in. Cut-off Machine.
 One Traverser Drill.
 One Jewellers'

NICHOLSON
AND
WATERMAN,
Providence, R.I.

DIAMOND DRILL FOR SALE—Offered at less than half price; Amer. Diamond, R. B. Co., make, with 700 feet of drill rods and all connections, in good working order. Takes $\frac{3}{8}$ inch core. Address
L. C. BIERWIRTH, Sec'y,
Dover, N.

WANTED TO BUY for cash, a good second hand set of
FINNERS' TOOLS AND MACHINES
Address,
Lock Box 279, No. Parma, N. Y.

NAVY DEPARTMENT,
WASHINGTON, D. C. *March 22, 1898*

Under authority conferred by the act of Congress, approved March 3, 1887, making an appropriation "for the purchase and completion of three steel cast, rough-bored and turned, six inch high-power rifle cannon, of domestic manufacture, one of which shall be of Bessemer steel, one of open-hearth steel and one of crucible steel," sealed proposals from domestic manufacturers to furnish the same, will be received at this Department until Tuesday, the second day of April, 1887, at which time they will be opened.

proposals will be opened. Proposals may be made either to furnish three completely finished six-inch, breech-loading, high-power rifle cannon, made from uncracked steel, one of Bessemer steel, one of open-hearth steel and one of crucible steel, or three breech-loading, rough-bored and turned cast-ings for such cannon of the same material, respectively, to be finished by the Department in accordance with the tenderer's design.

Such finished guns or such castings must be in accordance with the specifications prepared in the Bureau of Ordnance, and each gun, when completed, must be capable of safe y discharge of projectiles, weighing 100 pounds each, with a muzzle velocity of not less than 3000 feet per second.

No gun or casting for a gun will be paid for until the gun shall have been completed and have successfully stood the statutory test.

Proposals may be made separately for one or more guns, or for one or more castings as aforesaid; but no proposal will be considered unless accompanied by satisfactory evidence that the bidder controls a plant adequate to the production of guns of the type and quantity specified.

Each successful bidder will be required to execute a formal contract in accordance with his proposal and to furnish a bond, with satisfactory sureties, in a penal sum equal to fifteen per cent of the amount of his bid, conditioned for the faithful performance of such contract.

All proposals must be in duplicate, enclosed in envelopes marked "Proposals for Steel-cast Cannon," and addressed to the Secretary of the Navy, Navy Department, Washington, D. C.

WILLIAM C. WHITNEY,
Secretary of the Navy.

Sharon Steel Casting Co.

SHARON, PA.

are ready to receive orders for delivery in
August and later, for Steel Castings of all kinds
from one pound up to fifteen tons. Send specifics

ions for prices. All work guaranteed equal to

WANTED.—AGENTS TO SELL THE WINDOW BURGLAR ALARM; gives perfect protection; impossible for burglars to enter dwelling by the window without alarming the household; window can be left partially open at top or bottom, or both, and any movement of either upper

lower sash sets the gong ringing, and gives the alarm. Retail at 50¢. Sample sent to agents on receipt of price. Send for circulars. Address

STYLE'S FROST,
178 Devonshire St., Boston, Mass.

FOR SALE.

Ten (10) No. 2 Siemens Regenerative Gas Lamp
with **Factory** Fixtures and Reflectors complete

DANVILLE NAIL & MFG. CO.,

Danville, Pa.

WE BUY all kinds of
IRON AND STEEL SCRAP, BURNT IRON, OLD
RAILS AND CAST BORINGS
(in carloads *only*). Write us, naming quanti-

and price,
ROBINSON & ORR,
 115 Water St., Pittsburgh, Pa.
 (ESTABLISHED 1850.)

EXCELLENT BLACK COPIES OF *any* *thing* *printed*

AUTO COPYIST Only equalled
Lithography. Specimens free.
AUTOCOPYIST CO., 156 William St., New York

2000

CURRENT HARDWARE PRICES,

JULY 20, 1887.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at low or figure, the manufacturer's name, it is not stated that the quotations are selling at the prices quoted but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Ammunition.

Cap, Percussion, 7000—	
Black & Goldmark, 1-10/16	50¢
F. L. Waterproof, 1-10/16	50¢
E. B. Trimmer Edge, 1-10/16	50¢
Double Waterproof, 1-10/16	50¢
Double Waterproof, 1-10/16	50¢
Double Waterproof, 1-10/16	50¢
Double Waterproof, 1-10/16	50¢
Double Waterproof, 1-10/16	50¢
Double Waterproof, 1-10/16	50¢

Union Metallic Cartridge Co.	50¢
F. L. Trimmer	50¢
Cap. Fire Ground	50¢
Double Waterproof	50¢
Double Waterproof	50¢
Double Waterproof	50¢
Double Waterproof	50¢
Double Waterproof	50¢
Double Waterproof	50¢

Cartridges	
Rim Fire Cartridges	50¢
Rim Fire Military Cartridges	50¢
Cap. Fire Cartridges	50¢
Cap. Fire Cartridges	50¢
Cap. Fire Cartridges	50¢
Cap. Fire Cartridges	50¢
Cap. Fire Cartridges	50¢
Cap. Fire Cartridges	50¢

Shells—	
Paper Shot Shells, 1st & 2d or S. G. qual.	dis 15¢ 2 1/2
S&W's Combination Shot Shells.	dis 15¢ 2 1/2
Paper Shot Shells, Club, Rival, Climax.	dis 15¢ 2 1/2
Paper Shot Shells, Star Brand.	dis 25¢ 2 1/2
BRASS shot Shells, 1st quality.	dis 60¢ 2 1/2
BRASS Shot shells, Club, Rival & Climax.	dis 65¢ 2 1/2

\$100 | AMERICAN GIANT DYNAMO | \$100

Electro-Plating and Electrotyping Machines

IN ALL SIZES, FROM \$100 UPWARDS.



MILLER PATENTS

THE ZUCKER & LEVETT CHEMICAL CO.

CHEAPEST
AND BEST IN
THE MARKET.

Headquarters
for everything
in the Plating
and Polishing
Line.

NICKEL
PLATING
AND
POLISHING
MATERIALS.

ZUCKER & LEVETT CHEMICAL CO.,

ESTABLISHED 1863, INCORPORATED 1881,
SOLE MANUFACTURERS AND PATENTEES.

WORKS: 538 to 564 W. Sixteenth St. OFFICE: 36 to 40 Eleventh Ave., New York, U. S. A.

Trade Report.

Hitching Weight.....	50
Driving Reins.....	40
Hammock Ropes.....	60&20
Adjustable Web Halter.....	35
Web Halter.....	35
Bull Leads.....	35
Bull Snaps.....	35
Soldering Irons.....	35
Soldering Coppers.....	35
Bristle Card.....	35
Breast Chain, Short Snaps.....	50
Lengthening Snaps.....	50
Open Eye Breast Chain Snap.....	35
Breast Chain, Long Snap.....	50
Post Chain.....	60
Breast Chain, New Patent.....	50
Center Breast Chain Snap.....	35
Stallion Chain.....	35
Cart Breach End Irons.....	35
Cart Breaching Chains.....	30
Halter Chain.....	50
Rein Chain.....	60
Reel Chains.....	40
Chain Cow Tie.....	35
Back or Cart Chain.....	30
Long Tract Chains.....	35
Half Trace or Butt Chain.....	35
Balling Iron.....	35
Hitching Post.....	35
Rod Post Hitcher.....	60&20

ITEMS.

Having for some time sold their Sheep Shears to shearers, the Henry Seymour Cutlery Company, Holyoke, Mass., for whom Wiebusch & Hilger, 88 Chambers street, New York, are agents, are now selling them largely to the trade. In doing so they refer to the manner in which the Shears have endured the practical test to which they have thus been submitted, and give testimonials from shearers in many parts of the country as to the merit of the goods.

The Michigan Bolt and Nut Work, of Detroit, Mich., have just issued a neat 38-page catalogue of their specialties, which is appropriately illustrated, well printed and bound in flexible covers. Descriptions and price lists are given of a large variety of Bolts and Nuts, including Carriage, Machine, Stove, Plow, Tire and Sleigh-Shoe Bolts; Stove, Range and Furnace Rods; Machine Bolt Blanks, Log Screws, Step Irons, Bridge Rods, &c. Useful tables are included in the contents, showing the average number of Nuts in a keg; weight of 100 Square Head Wood or Log Screws of various sizes; number of Washers in a box or keg; weight of 100 Bolts of various sizes; weight of Bar Iron per lineal foot, &c. Billin & Cramer, 115 Dearborn street, Chicago, are general agents.

C. E. Hudson & Co., Leominster, Mass., issue a circular describing the line of Apple Paring Machines which they are manufacturing, with illustrations and explanation of their special features. They allude to the quality of their machines, the low prices at which they are offered, and the fact that they make a specialty of this line of goods. In connection with the machines they send out colored lithographs of unique design, which are intended for the use of the retail dealer in attracting attention to the machine.

Henion & Hubbell, Chicago, Ill., general Northwestern agents for the Silver & Deming Mfg. Company, of Salem, Ohio, are also agents for the Silsby Mfg. Company, Seneca Falls, N. Y., manufacturers of the Silsby Power Fire Pumps, and the Morris Machine Company, manufacturers of Centrifugal Pumps, of Baldwinville, N. Y. They are intending to make trade in Pumps a leading feature, and also carry in stock a full line of Well Supplies, Portable and Vertical Engines and Boilers, Wrought Iron Pipe Fittings, Brass Goods, Tools and other goods connected with this line of trade. They intend to add as rapidly as possible everything pertaining to hydraulic apparatus and water supplies. The catalogues and circulars which they issue represent the lines with some fullness. Their discount sheet, it will be remembered, was referred to in our last issue.

G. L. Bailey, Portland, Me., is patentee and manufacturer of a Dumb Bell, of which the handle is made of wood, and the heads fastened to its ends by a wrought iron bolt passing through the heads and handle. This Dumb Bell is alluded to as more symmetrical in form than the old fashioned one, more comfortable to handle, and very much stronger. Mr. Bailey has also designed and is making a patent Net Staff and Ring. The Net Ring is made of spring brass, and when not in use is carried in a hollow bamboo handle, which has a screw butt cap. When wanted for use the ends of the Ring are passed through slots in the head until spurs in the head enter holes in each end of the Ring, when the natural spring of the metal forces the ends down and holds the Ring firmly and securely in position. This article is alluded to as light and strong, while the handle, which has nickel-plated trimmings, can be utilized as a tip case when the ring is in position.

One of our exchanges alludes as follows to some of the inconvenience resulting from the use of nominal list and card prices which do not represent the real price of the goods:

Some of the trades, such as Glass and Iron makers, employ a complicated system of quotations with discounts that do them no good, because buyers keep themselves well posted as to actual rates. They sometimes cause considerable trouble either with workmen or with misinformed people, who engage in the business as rivals under false notions as to the profits to be made. In the Glass business there are sometimes three or four discounts to be taken off published prices, which reduce the selling rate to a third of the nominal price. The Nail Association

recently affirmed a \$2.25 "card rate," when Nails were selling in the open market at less than \$2. A strike in Western Iron mills was occasioned (in part, at least) by a published scale, which apparently showed that $\frac{1}{4}$ -inch Round Iron was selling at 1 cent a pound over the card rate, when in fact it was selling at three-tenths of a cent above the rate. A reform of quotations would not change the relations of buyers or sellers one particle, and might prevent troublesome suspensions on the part of workmen and misunderstandings on the part of venturesome or speculative capitalists always ready to go into a business they do not understand if the promised profits are large.

The A. F. Pike Mfg. Company, Pike Station, N. H., announce that they have completed their arrangements for Soapstone, and have associated with them Williams & Co., of Nashua, the owners of the celebrated Francetown Soapstone quarries, the quality of the Stone produced in which is alluded to. They state also that they have Vermont Soapstone of all varieties, and intimate that they are prepared to supply elegant goods of this description at prices that will secure orders. They are preparing a new catalogue of their line of Soapstone, Grindstones, Scythe Stones, Oil Stones, Razor Hones, &c.

E. C. Stearns & Co., Syracuse, N. Y., have recently added to their enlarging line several new articles. Among these may be mentioned a Door Clamp, which is referred to as entirely new in design, being a departure from the old style of Iron Clamp, and a register and ventilator added to the McGuire Thimble.

Phillips, Townsend & Co., Philadelphia, for whom S. A. Haines is agent, 90 Chambers street, New York, have promptly issued the revised lists of Wire Nails, circulars being already printed with the new prices.

The Gilbert & Bennett Mfg. Company, whose factories are at Georgetown, Conn., and Western office is at 228 Lake street, Chicago, are making arrangements to start a branch factory at Nos. 14, 16 and 18 South Canal street, Chicago. They will manufacture there a complete line of Wire goods, such as Screens, Riddles, Flower-Pot Stands, Muzzles, Traps, Conductor Strainers, Spark Guards, Gilbert's Rival Ash Sifter, Hardwood Ash Sieves, light crimped Wire work for window guards and railings, and a great variety of other articles. They took possession of the premises on the 14th inst., and will introduce facilities at once to manufacture these goods as extensively as the trade demands. A noticeable feature of this year's business of their Chicago house has been the unusual demand for Fruit Evaporator Cloth. Their sales in this line are fully double what they were last year at this time.

The Interstate Industrial Exposition, at Chicago, will open Wednesday, September 7, and close Saturday, October 22. Prospective exhibitors are already making arrangements for a display of their goods.

W. H. Barton, Philadelphia, announces the appointment of H. O. Stratton, 159 Franklin street, Boston, as agent for his Best American Flint and Garnet Paper and Emery Cloth. Mr. Barton states that he will carry at this agency a full line of these goods for the benefit of the New England trade, and that any orders intrusted to Mr. Stratton will receive prompt attention, and secure to purchasers the benefits to which they are entitled under the June 1 circular of the association of Sandpaper manufacturers. It will thus be understood that houses purchasing through Mr. Stratton will receive the same rebate as though they ordered direct from the factory.

A recent issue of the *British Trade Journal*, in an article on the Adelaide Exhibition, refers to some of the American exhibits under the care of the New York branch of McLean Bros. & Rigg. Among the concerns thus represented are the Henry Cheney Hammer Company, Little Falls, N. Y.; the Moline Plow Company, Moline, Ill.; the Standard Blade Company, Knoxville, Tenn.; the Baldwin Mfg. Company and the Miller Lock Company, Philadelphia.

OBITUARY.

The recent death of Thomas James, treasurer of the New Haven Copper Company, Seymour, Conn., at the age of 70, is announced. It was not unexpected, as he had been in very poor health for the past two years. Mr. James was a native of Swansea, Wales, and came to this country in 1838. When the New Haven Copper Company was organized in 1872 Mr. James became one of the principal stockholders, and in 1874 he was made president of the company, which office he held until 1880. In that year Thomas L. James, his son, was made president, the father being chosen treasurer, an office which he held at the time of his death. Mr. James is referred to as quiet and unobtrusive in manner and thoroughly domestic in his tastes. Appreciative tributes are paid to him, indicating the esteem in which he was held.

F.O.B.

We have received a large number of letters from houses in the trade in regard to their understanding of this term, and are prevented by the limitations on our space from giving more than a few of them in this issue. It will be observed that the diversity of views indicated in the letters previously published still continues. It is evident that the question is not a simple one, but that it has two strong sides, and that representative concerns of the highest standing

and intelligence can be found in support of either of the views. Referring to the letters already given, F. C. Linde & Co. Cresskill, N. J., write as follows, presenting the matter as it appears from their standpoint:

We have taken great interest in the views of the different parties, as published in your last issue, upon the meaning of the term f.o.b., or the short way of expressing free on board. Taking the question as applying to ourselves: We sell a Western jobbing house a bill of goods with the understanding that they put a single set in a paper box, the railroad company would refuse to receive in this condition, or if received would do so at owner's risk, and charge for freight in proportion to cost of handling and transportation; therefore, in order that our customer may receive the goods in merchantable condition we pack in cases suitable for transportation. Unless otherwise specified, these cases on arriving at destination belong to us, and can be claimed by us, either to be returned as empties, or sold for our account, but we have no right to charge the same to our customer unless so agreed. We think we have no more right to charge for those cases than has the grocer from whom we buy a $\frac{1}{2}$ pound of tea to charge us for the paper bag in which we carry the same home. Having believed this to be correct, we have sold our production invariably f.o.b. at nearest point of shipment, by route as designated by purchaser, at a net price as agreed upon, and can assure you we have never had a single party find fault because we did not charge them with the expense of boxing.

Lalanc & Grosjean Mfg. Company, 19 Cliff street, New York.—In our opinion f.o.b. should include boxes and packing whenever necessary to insure safety in shipping.

Hermann Boker & Co., New York.—Where we have been in the habit of charging for cases or cartage, and should receive an order stating f.o.b., we certainly would charge for packages if we accepted the order f.o.b.

Brown & Farrell, Nashville, Tenn.—F.o.b. means, as we understand it, no charge for cartage. Cases do not enter into any figure unless specially contracted for.

Tudor Iron Works, St. Louis, Mo.—We cannot answer your question from experience. Most of our material is shipped in bulk, but when we ship in cases no charge is made for them. If we may be allowed to express an opinion, would say that the term f.o.b. has no connection by implication or otherwise with the cases in which the goods may have to be packed.

Buford Bros. & Just, Nashville, Tenn.—In our opinion the term f.o.b. simply implies that the goods are to be delivered free of charge on board of cars or boats, and nothing more.

Blish, Mize & Silliman, Atchison, Kan.—We understand f.o.b. to mean no charge for boxes or cartage. It would be impossible for a shipper to put certain kinds of goods "on board" without boxing, as the railroad or boat would not receive them, and if boxes are necessary to enable shipper to get goods "on board" he must box them and furnish the boxes free of expense to purchaser of goods.

Puckard & Co., Greenville, Pa.—Our understanding of the term f.o.b. is no charge for boxing or putting on board cars, and have never had this view disputed. We invariably give this with sales made by us f.o.b. and exact it from others.

Logan, Gregg & Co., Pittsburgh, Pa.—Custom has made the term f.o.b., as applied to Hardware, to mean free of charge for boxing and cartage. This was not the original meaning, but the revolt against charge for boxing has made the change in this term. At the same time we usually make the matter sure when writing an order by saying "no charge for boxing or cartage."

Dover Stamping Company, Boston, Mass.—In our practice f.o.b. means free on board, involving no charges intermediate between our goods in stock and the same on board, and this means properly packed to facilitate transportation—i. e., packed with due regard to the length and nature of the voyage.

Clark, Widdifield & Co., Cincinnati, Ohio.—Our understanding is and always has been that f.o.b. means free on board without charges of any kind—case or cartage.

Kansas City Hardware Company, Kansas City, Mo.—We have always considered it only applicable to transfer charges to cartage.

Matthai, Ingram & Co., Baltimore, Md.—We understand the term f.o.b. means free of both boxing and cartage at the point of shipment, and so govern ourselves when we purchase.

Pappenheimer Hardware Company, Cincinnati, Ohio.—The term f.o.b., in our opinion, clearly refers only to cartage; add "no charge for package" and it will then make cases free.

Pratt Hardware Company, Buffalo, N. Y.—When we buy goods free on board we understand it to be free of package and cartage.

Evring & Gaines, Nashville, Tenn.—We think f.o.b. means free of every charge.

Beck & Corbitt Iron Company, St. Louis, Mo.—We understand the term f.o.b. as applied to cartage only, and do not consider that it has anything whatever to do with a charge for cases.

Geo. M. Maris & Co., Columbus, Ohio.—We understand the term f.o.b. as meaning free on board cars, with no charge for cases or cartage. We have in every instance where cases were charged and goods bought f.o.b. deducted same from invoice, with no objection raised by parties of whom bill was purchased.

Chas. Humes & Co., St. Louis, Mo.—When we use the term f.o.b. we except from charge both case and cartage.

Mitchell Bros. & Co., York Beach, Me.—We understand the term f.o.b., as applied in the purchase of a bill of goods, to signify that no charge is to be made for cases or cartage.

James L. Haven Company, Cincinnati, Ohio.—When we quote the term f.o.b. it is

applied as no charge for packages and drayage—or, in other words, prices of goods delivered at the depot.

St. Louis Hardware and Cutlery Company, St. Louis, Mo.—We understand the term f.o.b. to mean merchandise delivered on board of cars or steamer free of charge for cases and cartage, unless it is especially agreed to pay for case.

Van Wagener & Williams Company, 82 Beekman street, New York.—We understand the term f.o.b. to apply to cartage, not to cases. Permit us to add that, in our judgment, buyers should discriminate between purchases of jobbers in broken lots and purchases of manufacturers. Manufacturers can always include price of cases in their estimate of cost, but it is almost impossible for jobbers in repacking goods to do so. Hence, what is just for a jobber to do in respect to charging for cases, can be, apparently, waived by a manufacturer.

Livingston Horse Nail Company, New York.—The term f.o.b. has reference to cartage only. The cases on such goods as have to be packed in various quantities are charged for by factories at or near actual cost, and have nothing to do with the term f.o.b.

H. L. Pratt, Miller's Falls Co., New York.—I understand that f.o.b. refers only to the cartage. Any previous custom between the parties in regard to cases would still prevail.

Sargent & Co., New York.—F.o.b. "has nothing to do with the case." Nor have the flowers that bloom in the spring, unless the buyer, with an elastic conscience and an India-rubber mentality, should choose to construe it as meaning free of boxes.

Plymouth Mills, Plymouth, Mass.—When we quote f.o.b. cars here, it means cartage free. When we quote f.o.b. cars Chicago, it means that we deliver free of all expenses on the cars at Chicago. The matter of cases does not enter into the transaction, and is not implied in the letters f.o.b., one way or the other. The charges for cases is regulated by the custom of manufacturers or dealers in different lines. We never charge for cases, and such a thing is never mentioned in our lines. Some lines always charge for them.

Whitaker & Co., Toledo, Ohio.—Refers only to cartage.

Wm. A. McCall & Co., Cincinnati, Ohio.—It is our understanding that the term f.o.b. means no charge for package or drayage.

L. M. Dayton, Cincinnati, Ohio.—My understanding of the term f.o.b. is, that goods are to be delivered free on board, with no reference whatever to cases; it only refers to cartage.

Rector & Withelmy Company, Omaha, Neb.—We always understand f.o.b., in buying goods, to be just what the term implies, without any additional charges for packing, carting or cases.

Hovell, Gano & Co., Cincinnati, Ohio.—Our construction of the term f.o.b. signifies delivered at transportation company's depot without charge for either package or cartage.

Central Stamping Company, 25 Cliff street, New York.—The term f.o.b., as used by us, simply signifies that goods are to be delivered at the transportation company's dock or depot free of charge, and that the consignees are responsible for all further expenses. We have not for a long time charged for cases, so that the question has never before arisen with us. We should say that the significance of the term would be a matter of special agreement.

Sligo Iron Store Company, St. Louis, Mo.—We understand it to refer only to cartage.

Shadbolt, Boyd & Co., Milwaukee, Wis.—We understand the term f.o.b., as applied to purchases on bill of goods, to signify that no charge is to be made for cartage. If the goods require package or cases, that should be charged for.

Leeds, Robinson & Co., Boston, Mass.—Cartage only.

Gray, Fall & Co., Nashville, Tenn.—When we sell goods f.o.b. we make no charge for cases or drayage, and in buying f.o.b. we do not expect to pay for either.

Robinson Bros. & Co., Louisville, Ky.—The term f.o.b., as we understand it, refers only to cartage and not to cases, unless otherwise stipulated.

Sievers-Carson Hardware Company, Louisville, Ky.—Our opinion in the matter above is that f.o.b. means no cartage, and cases are not meant. No charge for the latter where a special agreement is made to that effect.

Maher & Gross, Toledo, Ohio.—We understand f.o.b. to mean delivered free on cars without cost for case or cartage.

Baker, Gray & Co., Detroit, Mich.—We do not understand that f.o.b. refers to boxing or any charges for packing, but simply to cartage.

Kilbourne & Jacobs Mfg. Company, Columbus, Ohio.—We think there is no established rule of practice, but that in cases where it is customary to charge for boxing or crating, it would generally be understood as referring to cartage only. In our own practice, however, it would mean free of all charges for cases or cartage.

Hart Hardware Company, Louisville, Ky.—We understand the term to signify no charge for cartage, as package is a separate item.

H. Mithoff & Co., Columbus, Ohio.—F.o.b. signifies only no charge for drayage, and has nothing to do with cases.

Witte Hardware Company, St. Louis, Mo.—In our opinion the term f.o.b. refers only to cartage, and we always have a separate and distinct understanding as to charge for cases.

Ewald Iron Company, St. Louis, Mo.—F.o.b. in case of a sale to a railroad, in our particular line of goods, would mean free on board cars in shipping order. However, among the Hardware dealers throughout the country when ordering goods that should be packed they expect to be charged for the packages or boxes, or have a distinct understanding beforehand that they make no allowance for boxes. We think it is rather an open question, but in the strict sense of the term there is no doubt but what the term f.o.b. means free of any cost to the buyer, except the price of the goods.

Exports.

The following table presents the exports of Hardware, Iron, Steel, Metals, &c., from the port of New York, for the week ending July 19, 1887:

Argentine Republic	Quant.	Val.	Hdw., pkgs.	Quant.	Val.
Sew. ma., cs.	81,484,959		Sew. ma., cs.	109,245,66	
Mach'y, pkgs.	48,243,41		Per caps, cs.	7,314	
Mf. iron, pkgs.	50,560		Cartridges, cs.	62,139	
Wringers, cs.	1,36		Tacks, cs.	15,144	
Cutlery, case.	1,19		Cutlery, cs.	162,200	
Tinware, cs.	1,12		Boiler tubes, 50	60	
Graneware, cs.	18,100		Ag. imp., pkgs.	13,135	
Ag. imp., pkgs.	72,783		Brass goods, case	1,7	
Hdw., pkgs.	439,6150				
Clocks, cs.	28,2136				
Wash. mach.	30				
CS., cs.	30				
Tacks, cs.	4				
Amsterdam					
Ag. imp., pkge	1,11				
Pumps, pkgs.	6,400				
Hdw., pkgs.	2,29				
Copper, cks.	18,2320				
Antwerp					
Hdw., cs.	76,1658				
Mf. iron, pkgs.	16,90				
Bremen					
Mf. iron, pkgs	28,881				
Hdw., cs.	23,429				
Firearms, cs.	1,40				
Ag. imp. pks.	2,130				
Metal clasps, case.	1,76				
Brazil					
Cutlery, cs.	30,739				
Cartridges, cs.	16,324				
Mf. iron, pgs.	17,397				
Sew. ma., cs.	35,610				
Tinware, cs.	32,1248				
L.omotive, 1	5,500				
Pumps, pkgs.	1,5				
Mach'y, pkgs.	139,8465				
Cotton gins, cs.	33,1378				
Rifles, cs.	3,288				
Clocks, pkgs.	23,543				
Nails, kegs.	50,119				
Hdw., pkgs.	162,1365				
Ag. imp., pkgs	34,2810				
Tacks, cs.	14,118				
British Honduras					
Tinware, case	1,2				
Pumps, pkgs.	3,20				
Nails, kegs.	55,286				
Hdw., cs.	4,31				
Cutlery, cs.	2,52				
British East India.					
Pumps, pkgs.	1,30				
Mach'y, pkgs.	4,275				
Clocks, bxs.	48,718				
British Possessions in Africa.					
Ag. imp. pkgs.	51,839				
British Australia.					
Mach'y, pkgs	7,700				
Mf. iron, pkgs.	3,58				
Berlin					
Ag. imp. pkge	1,100				
British West India.					
Yellow metal, cs.	3,114				
Tinware, cs.	8,188				
Mf. iron pkgs	26,442				
Ag. imp. pkgs.	8,86				
Mach'y, pkgs.	11,20				
Copper, pce.	1,48				
Pumps, pkgs.	5,56				
Nails, kegs.	27,305				
Sew. ma., cs.	9,102				
Hdw., pkgs.	45,363				
Clocks, cs.	2,16				
Firearms, cs.	1,39				
Granite ware, 8	2				
Central Stamping Company					
Printing press	1,23				
Wire cloth, bx	1,13				
Copper worm	1,186				
Mf. cop. pkgs	3,95				
British Guiana.					
Sew. ma., cs.	6,178				
Ag. imp., pkgs	9,28				
Nails, cs.	17,61				
Hdw., cs.	9,97				
China.					
Pumps, pkgs.	11,699				
Nails, kegs.	198,311				
Clocks, pkgs.	116,3144				
Copenhagen.					
Mf. iron, pkgs.	19,255				
Cuba.					
Mf. iron, pkgs	42560				
Ag. imp., pkgs.	10,82				
Hdw., cs.	8,192				
Tinware, cs.	10,149				
Clocks, cs.	13,21				
Sew. ma., cs.	29,322				
Mf. iron, pkgs.	18,312				
Cutlery, pkgs.	13,1771				
Pumps, pkgs.	7,304				
Nails, cs.	3,48				
Spikes, kegs.	149,548				
Car. F. id ges.	1				
Cardiff.					
Bathtub, 1	134				
Pumps, cs.	1,75				
Hdw., pkgs.	218,3710				
Mach'y, pkgs.	148,312				
Iron, pkgs.	22,282				
Car wheels.	60,280				
Br. gds, pkgs.	31,269				
Tin, bxs.	3,30				
Wire goods					
	3,31				
Chile.					
Hdw., cs.	101,1599				
Mf. iron, pkgs.	12,279				
Mf. iron, pkgs	10,2015				
Spring, cs.	2,245				
Pumps, pkgs.	16,757				
Nails, bxs.	29,53				
Car. F. id ges.	1				
case.	1,22				
Firearms, cs.	2,408				
Mach'y, pkgs.	83,5105				
Ag. imp., pkgs	14,553				
Hdw., cs.	2780,6715				
Tacks, cs.	49,188				
Cardiff.					
Mf. iron, pkgs	1,5				
Newfoundland.					
Mach'y, pkge.	1,16				
Sew. ma., cs.	3,24				
Hdw., cs.	6,81				
Mf. iron, pkgs	3,91				
Nova Scotia.					
Hdw., cs.	2,140				
Ag. imp. pkgs.	4,30				
New Zealand.					
Hdw., pkgs.	108,2312				
Mf. iron, pkgs.	9,190				
Pumps, pkgs.	5,254				
Boiler, cs.	1,840				
Mach'y, pkgs.	9,116				
Ag. imp. pkgs	743,16723				
Hdw., cs.	18,151				
Sew. ma., cs.	33,615				
Mf. iron, pkgs	89,765				
Wringers, cs.	11,211				
Nails, cs.	22,494				
Mexico.					
Mf. iron, pkgs.	413,2364				
Mf. pkgs.	41,1835				
Clocks, cs.	9,3293				
Tinware, cs.	9,329				
Nails, cs.	12,61				
Nails, kegs	449,1088				
Tin plate, bxs	83,310				
Firearms, cs.	23,284				
Firearms, cs.	3,229				
Peru.					
Mch., pkgs.	9,696				
Copper tube, 1	310				
Nails, kegs.	22,11				
Brass, cs.	8,117				
Hdw. goods, case	1,192				
Porto Rico.					
Copper, roll.	1,30				
Sew. ma., cs.	2,35				
Hdw., cs.	109,759				
Cartridges, cs.	4,80				
Brass goods, case	1,60				
Tinware, cs.	3,77				
Nails, kegs.	10,31				
Nails, cs.	3,13				
Wash. mach., pkge.	1				
Mf. iron, pkgs	31,169				
Hdw., pkgs.	2,45				
Clocks, case.	1,15				
Hdw., pkgs.	60,490				
Ag. imp. pkgs.	6,319				
Rotterdam.					
Mf. iron, pkge	1,50				
Ag. imp. pkgs	3,11				
Spanish Possessions in Africa.					
Pumps, pkgs.	2,57				
Mf. iron, pkge	1,21				
Mach'y, pkge.	1,20				
Hdw., cs.	9,31				
Cutlery, cs.	1,19				
Clocks, bxs.	17,323				
Santo Domingo.					
Nails, kegs.	85,324				
Brass goods, cs.	2,46				
Pumps, cs.	2,39				
Ag. imp. pkgs.	10,28				
Mach'y, pkgs.	10,28				
Mach'y, pkge.	1,105				
Hdw., cs.	13,163				
Mf. iron, pkgs	42,467				
Copper goods, case	1,2				
Lead pipes, cs.	2,23				
Tinware, case.	1,18				
Clocks, case.	1,13				
Cutlery, cs.	1,19				
Per. caps, cs.	2,66				
Fire engine, 1	74				
U. S. of Colombia.					
Mf. iron, pkgs.	399,3909				
Hdw., pkgs.	79,3097				
Cutlery, cs.	20,188				
Steel, pkgs.	22,35				
Pumps, pkgs.	10,12				
Axis, cs.	22,110				
Tinware, cs.	11,182				
Clocks, pkgs.	9,327				
Ag. imp. pkge.	1,7				
Ag. imp. pkgs.	1,25				
Cutlery, case.	1,25				
Mf. brass case.	3,21				
Nickel case.	1,250				
Zinc, drums.	1,145				
Cutlery, cs.	4,1222				
Hdw., pkgs.	67,110				
Nails, kegs.	70,619				
Wire gds, cs.	2,40				
Iron, bars.	228,50				
Cutlery, cs.	1,28				
Copper worm	1,186				
Mf. cop. pkgs	3,95				
Metal sheath, 10	482				
Revolvers, bx.	1,10				
Mf. lead, pkge.	1,16				
Valves, cs.	10,345				
Uruguay.					
Clocks, cs.	7,205				
Cutlery, cs.	54,1000				
Pumps, pkgs.	12,835				
Mach'y, pkgs.	2,187				
Hdw., cs.	6,19				
Mf. iron, cs.	64,191				
Mf. iron, pkgs	19,217				
Nails, bxs.	240,681				
Venezuela.					
Hdw., pkgs.	39,376				
Nails, pkgs.	7,76				
Mf. iron, pkgs.	65,44				
Boiler, cs.	1,40				
Steel, pkgs.	1,28				
Nails, cs.	11,101				
Mach'y, pkgs.	4,283				
Iron, pkgs.	98,994				
Steel, pkgs.	8,123				
Tinware, cs.	8,24				
Clocks, case.	1,35				
Locomotive	1,6500				
S. cel, pkgs.	40,126				
Carriages, cs.	1,120				
	11,46				
Central America.					
Rifles, case.	1,26				
Hdw., pkgs.	57,96				
Nails, kegs.	10,10				
Clocks, cs.	21,49				
Revolvers, case.	1,182				
Iron, pkgs.	132,334				
Cutlery, cs.	6,478				
Per. caps, cs.	1,48				
Ag. imp. pkgs	11,131				
Cartridge, cs.	2,33				
Tinware, cs.	2,116				
pkgs. mals.	4,80				
Mf. iron, pkgs.	292,1448				
Mach'y, pkgs.	9,282				
Steel, pkgs.	2,48				
Sew. ma., cs.	81,1540				
Car wheels, 1	8,192				
Pump, pkgs.	11,39				
Copper, case.	1,28				
Canada.					
Rifles, cs.	2,167				
Quick silver, 26	840				
Dutch East Indies.					
Pumps, pkge.	1,22				
Dutch West Indies.					
Sew. ma., case.	1,10				
Hdw., cs.	9,118				
Tacks, cs.	2,9				
Clocks, case.	1,44				
Ecuador.					
Cutlery, cs.	5,177				
Mf. iron, pkgs	165,1449				
Mach'y, pkgs.	9,148				



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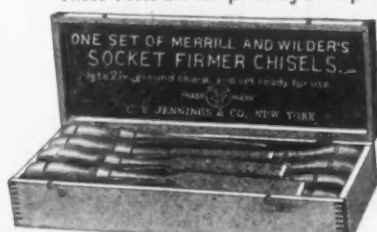
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THE WEEK.

The great activity in railroad construction is stimulating shop building, West and South especially. The Taunton Locomotive Works will add 3000 feet of floor space, and additional capacity will be supplied at Paterson and elsewhere. Locomotive capacity is wanted on nearly every railroad line in the United States. A great enterprise is to be started near Anniston, Ala., to employ 1600 men in making everything in rolling stock from freight and passenger cars to locomotives. It will cost \$1,500,000.

Texas is going to roof her new State House with 800 squares of copper.

Charles T. Parry, the senior member of the firm of the Baldwin Locomotive Company, died at his cottage at Beach Haven, on the 18th inst., from a lingering illness. Mr. Parry was born in Philadelphia, September 15, 1825. He worked for a time on a farm in Bucks County, and, when old enough, entered the Baldwin Locomotive Works as an apprentice. Up to that time the works had not built over 50 locomotives. Young Parry made rapid strides. He began his career in the pattern-room; then he passed to the drawing department. In a few years he was made general superintendent of the works. In 1867 he and George Burnham purchased the Baldwin interest and became partners in the firm of M. Baird & Co. After the death of Mr. Baird the firm became Burnham, Parry & Co. Mr. Parry excelled in executive ability. He was the engineer of the immense works, and brought them to their present state of perfection. He was particularly skillful in devising tools to diminish labor. Last October, the semi-centennial of Mr. Parry's connection with the establishment, was celebrated, and all the employees united heartily in the event. Mr. Parry was especially liked by all his workmen. He was very successful in settling all their grievances and in bettering their condition. Mr. Parry was a member of the Franklin Institute, and was regarded as an expert on boilers. He contributed frequent papers to the *Franklin Institute Journal*, and was highly regarded as a member. He was shrewd in all his business transactions, and it is said that his fortune is not less than \$3,000,000. He made frequent trips to Europe, and about 10 years ago spent considerable time in Russia supervising the building of locomotives for the Government.

The law prohibiting the importation of contract labor is said to have been disregarded by several watch manufacturers in the United States, and Mr. Langbein, counsel for the United Watchmakers of North America, has accordingly made a formal protest directed to the agents of the American Waltham Watch Company. It appears by contracts which Mr. Langbein has secured, that watchcase makers have been from time to time engaged on behalf of the Waltham Watch Company in England, Switzerland and France to come out here and work, their expenses being advanced and a contract being entered into by them that these they would refund out of their earnings after they got to work. When the debt was liquidated the written undertaking was stamped and receipted and handed to them. The documentary evidence spoken of consists largely in a collection of these receipts.

A delegation of prominent citizens of Kansas are in Washington City for the purpose of protesting against the employment of Professor Wiley, of the Agricultural Department, to superintend the expenditure of any part of the \$50,000 appropriated by Congress for experiments in making sugar from sorghum. They charge that Professor Wiley in his experiments last year at Fort Scott, Kan., made a failure for the purpose of discouraging the attempt to produce sugar from sorghum, as they say, in the interest of the beet-root sugar industry of Europe. They claim that Kansas alone can produce from sorghum all the sugar needed in the United States for 3 cents per pound.

A Newark manufacturer of patent leather says the Manufacturers' Association of that city are under heavy bonds to conduct their business hereafter independently of the Knights of Labor, and that if the shops close only men who abandon that organization will be employed.

Jacob Sharp, recently convicted of bribing the New York Aldermen in 1884, was sentenced to four years at hard labor in the State prison at Sing Sing and to pay a fine of \$5000. In pronouncing sentence Judge Barrett said: "We have before us a monstrous crime, the greatest and most infamous ever committed in a civilized community, the raising of \$500,000 for the corruption of an entire legislative body. Sharp, Kerr and Foshey are also guilty of downright grand larceny, and could have been tried for this offense, besides that of bribery. Having with the aid of Kerr and Foshey fished \$500,000 to bribe the Aldermen, Sharp has also managed by fraud and trickery to put \$2,500,000 in his own pocket."

Neafie & Levy, of Philadelphia, contend plate making an extensive addition to their boiler shops in the shape of an hydraulic rivetting plant.

A Panama dispatch says the Colombian Government has passed a law imposing an import duty on all goods in transit at the Isthmus, but as such a measure is in contro-

vention of treaties with foreign powers, the Colombian consul in New York does not profess to understand the true situation.

By order of the Dock Board, all advertising signs along the river front are to be removed, only the names and business of the occupants of the piers to be permitted.

The Southern Pacific Railroad managers proclaim their intention of extending their road below the Mexican line to Yuma, under a grant of \$12,000 per mile from the Mexican Government.

A "prune syndicate" attempted a corner which resulted in disastrous collapse, bringing the parties concerned into bankruptcy, while the goods were sold at auction for what they would fetch.

Four salaried officers under a chief assume the control of the erection of telegraph and telephone poles in this city under rules approved by General Newton, Commissioner of Public Works. Electric poles are to be of iron at least 26 feet high, and other poles at least 60 feet high. No arc electric light or power wires shall be stretched over any part of any house or other building.

Many choice varieties of oranges have been introduced into Louisiana from Europe, Brazil and Japan. Some of the best are from Florida seedlings.

The fast time made by Norman L. Munro's Herreshoff yacht *Now Then* excites much interest. The distance between Newport and New York is scheduled as 170 miles. The *Now Then* made it in seven hours and four minutes, which would make her average hourly speed 24 miles approximately. The measurements of the *Now Then* are as follows: Length over all, 85 feet; water line, 81 feet; beam, 10 feet; draft of water, 3 feet 3 inches. Mr. Munro considers the *Now Then* to be the fastest steamer on this side of the Atlantic.

The National Association of Master Painters, at their convention in this city last week, adopted a resolution favoring the system of apprenticeship, the length of the term of apprenticeship to be determined by the local associations in the different States of the Union, the apprentice at the expiration of his term of apprenticeship to receive a certificate which shall declare him to be a good workman; only proficient workmen shall receive certificates, and, finally, no apprentice who is employed by a master painter shall be engaged by another master painter without the consent of the former employer.

A new combination have been formed for the control of the envelope trade. Nine of the leading firms in the business have united in forming the Standard Envelope Company, and this company have made a contract with five outside firms by which for the next five years the prices and terms of sale of envelopes at the factory shall be uniform and such as will leave a profit to the manufacturers. The circular sent to the jobbers and dealers says that there has been no profit in the business lately and that they propose to have a change. The manufacturers say that the scheme of merging the interests of all into one company will make the new venture a success, particularly as the machinery used by the trade is patented and the patents are owned in the right place. If any firm make an unauthorized out they will find themselves defendants in a suit for damages at once, besides being in danger of losing the right to use certain appliances. The extent of the advance in the price of envelopes is variously stated by different representatives of the new concern in this city at from 5 to 20 per cent. The daily production of envelopes in the country is from 10,000,000 to 12,000,000.

The officers of the bark *Orden*, arrived at Philadelphia, report that in the equatorial regions a large sword fish, 25 or 30 feet long, ran into the vessel and afterward broke away, leaving 2½ feet of its nose fastened in the hull. Two feet projected beyond the outer plank. The material pierced consisted of 4 inches of stout Norwegian pine, 7 inches of filling in and 5 inches of interior casing.

Mr. James H. Richardson, executor of the late Col. Edward Richardson, of Mississippi, the cotton king of the South, has this year 38,000 acres in cotton and 7000 in corn.

The Standard Oil Company have contracted with John Roach's Sons, Chester, for the construction of an iron barge for carrying oil in bulk in the coastwise trade. The barge will be 153 feet long, and have 275,000 gallons capacity. She will be towed in the same manner that the coal barges are to the coastwise ports. If this barge proves a success further contracts will be given.

The St. Lawrence Sugar Refinery, in Montreal, was burnt on the 15th inst.; loss, \$650,000; insurance, \$420,000. The same day a fire in the New England Shipbuilding Company's yard, at Bath, Me., destroyed three vessels on the stocks and a barkentine on the railway, together with two shops; loss, \$100,000.

The strike at the Delamater Iron Works has been lost by the strikers, who belonged to the Knights of Labor. Their places have been taken by the members of the founders' and molders' union.

The Brooklyn Elevated Railroad Company had little difficulty in filling the places of the striking engineers. After two or three days trains were running with their usual regularity in charge of new men. The State

Board of Arbitration and representatives of the firemen and engineers alike vainly endeavored to adjust differences by arbitration, as the railroad company resolutely refused to discharge men who came to their relief in order to make room for those who voluntarily left their positions, and the strikers would return only as a body. An officer of the road said: "There is one thing I guess the strikers did not bargain for. That is the non-support of the Knights of Labor. District No. 49 has an old bone to pick with the two brotherhoods, and is aiding us in a way that makes the strikers sick. The support from that quarter is one reason why our new men are so well qualified."

The Albany day boat *New York* made her first trip on Monday, and attained the remarkable speed of 24 miles an hour. She left New York at 4 minutes past 9, and made West Point, 50 miles from New York, at 11.40, or nearly 20 miles an hour. She had been carrying 28 or 30 pounds of steam, but off Hampton Point the hand on the steam gauge traveled between 37 and 39 pounds, and she increased her speed from 28 to 31 turns a minute, and ran from Hampton Point to Milton, 5 miles against tide and wind, in 13 minutes, or at the rate of 23 miles and a fraction an hour, and from Milton to Poughkeepsie, 4 miles, in 10 minutes, or at the rate of 24 miles an hour. Her feathering buckets were making 280 dips a minute, and she squatted down aft until the bottom of her guard over the rudder was within 2 feet of the water.

A colony of Icelanders have arrived at Quebec, bound for Manitoba, and 700 more are expected to follow. All are impoverished by the failure of crops, but they were not driven to an extremity until a terrific snowstorm last May, which continued five days until the 24th, when thousands of sheep and cattle were buried alive. The population of Iceland is about 70,000 souls.

The manufacture of tin cans, made for packing fruit and vegetables, is receiving the attention of the Knights of Labor in Philadelphia, who have issued an official circular declaiming against the "cheap and deleterious liquid fluxes used in machine soldering," while hand-made cans alone are pronounced worthy of favor.

The Secretary of the Navy has accepted the proposal of the Midvale Steel Company for about 65 tons of steel gun forgings, at a total cost of \$53,385.65.

A San Francisco dispatch of Monday says a disagreement has arisen between the Canadian Pacific Railroad people and the Pacific Coast Steamship Company. Governor Perkins, of the latter company, has given the required notice of 30 days to terminate their existing contract to carry freight for the Canadian Pacific road. The trouble is due to the fact that the amount of business that the Canadian Pacific handles to and from San Francisco at present does not warrant the steamship company in continuing the very low rates made to Port Moody to enable the foreign road to make low through tariffs on overland shipments, in order to underbid American railroads.

Geo. C. Reis, one of Pennsylvania's best-known iron manufacturers, was accidentally killed, 12th inst., by the railroad cars on a side track at Iron Rivers, Mich., where he recently came into possession of a valuable furnace plant. He was 60 years of age.

The New York Tax Commissioners experience great difficulty in collecting personal taxes under the present law. Jay Gould is assessed \$500,000 this year, but he strenuously objected to paying so large an amount, declaring that he was not liable, but he did not swear off. Cyrus W. Field swore off entirely, and Russell Sage swore his down to \$50,000. The largest single personal assessment is that on the Vanderbilt estate for \$8,000,000. Mrs. Emily H. Moir, the heir to Mrs. Morgan's property, pays the largest personal assessment of any woman—\$500,000. Mrs. Sarah H. Green comes next at \$300,000.

The new law in the State of New York forbidding the widespread practice in branches of retail trade of making purchasers a present of some trifling article with every purchase of a certain amount of goods, took effect July 1. The grocery trade will be particularly affected.

Buffalo is to have another grain elevator of 2,500,000 bushels capacity.

The complete double tracking of the Grand Trunk Railway between Montreal and Toronto has commenced at three different points, and it is understood that, this work accomplished, double tracks across the Victoria bridge must necessarily follow.

The burning of the huge Metropolitan Storage Buildings, on Sixth avenue and Thirty-eighth street, in this city, entails a loss estimated at \$400,000. The contents of the building were entirely destroyed, including 500 valuable trunks, 75 pianos, &c. It is truly said that had the Metropolitan warehouse been made of stone and iron throughout, and had it been as solid as the Egyptian Pyramids, it does not appear that the goods stored in it would have escaped destruction. So soon as fire broke out among them, the firemen, by opening the doors and windows at the bottom, and the roof at the top, converted the structure into a huge furnace, with a magnificent draft, which would have consumed anthracite coal,

and in which such easily combustible stuff as furniture, pictures, clothing, theatrical scenery, and similar articles had not the ghost of a chance. Fire-proof compartments alone could have saved any portion of the goods.

The work of laying the electric wires in this city has commenced, tunnels of cement and gravel being built to receive the wires, with manholes from 200 to 400 feet apart. The trunk line will start from Whitehall street and Broad street and from Broad to Wall street; from there up to Cortlandt street, where there will be a branch to the telephone offices located there; then through Broadway again, by the newspaper offices in Park Row and to the bridge, were a cable in connection will extend across the bridge to Brooklyn. The trunk line from the Battery will continue up Broadway some distance and then go west, taking one of the streets parallel to Broadway, perhaps Church street, up town.

The other day Mr. Ives sent his check for \$87,000 to Mr. William H. Starbuck for the steamer yacht *Tillie*. The yacht was formerly known as the *Polynia*, and was built by James Gordon Bennett at a cost of \$150,000. One day Mr. Bennett telegraphed instructions to sell the *Polynia* at auction to the highest bidder. Among those in attendance at the sale was William H. Starbuck. The auctioneer appealed to Mr. Starbuck, and, there being no other bid and no reserved price, the boat was sold for \$87,000. Mr. Starbuck had the yacht shortened about one-third by cutting her in two aft the engines, at an outlay of \$40,000.

Word comes from Philadelphia that the Knights of Labor are fast disintegrating. The writer says: "The causes which have led to this deplorable state of affairs are not far to seek. First, the K. of L. have exhausted themselves and impoverished their treasuries through their innumerable strikes and labor dissensions. They have suffered defeat in almost every recent fight which they have waged against their employers, and consequently they have come to place but little confidence in the advantages and capabilities of their organization. Besides this, and notably since the Richmond convention of the General Assembly last October, a deep-seated conviction has entered the minds of the thinking members of the order that the management of affairs is not at all such as it should be."

The Harlan & Hollingsworth Company, of Wilmington, Del., have contracted to build a steel schooner yacht, from designs by A. Carey Smith, for Chester W. Chapin, vice commodore of the Florida Yacht Club, of the following dimensions: Length over all, 132 feet; water line, 110 feet; beam, 27 feet; depth, 10 feet.

Money to the amount of \$4,000,000, obtained through an issue of stock by the Pennsylvania Railroad Company, will be used, among other things, for the building of the elevated railroad through Jersey City, extending the four-track system from Jersey City to Harrisburg, the enlargement of terminals at Jersey City and in this city, and the purchase of new equipment.

David Dudley Field, of the United States Supreme Court, made a powerful plea before the International Arbitration, of London, in favor of an Anglo-American tribunal, which might result in at least a partial disarmament of Europe, thus returning to the walks of industry millions of men who are now a burden to the taxpayer. Was it beyond the will of man, he asked, to form a European compact for a simultaneous and proportionate reduction of armaments and for the reference of whatever dispute might afterward arise between nations to arbitrators? There was no reason why such a compact should not be made, except that each nation could not trust its neighbor. There were, Mr. Field admitted, immense obstacles opposed to the principles of arbitration, but wherever the members of the association saw a chance for the education of public opinion on the question—wherever they saw a chance of applying the principle of arbitration—they should unceasingly work for the cause. "I am not confident," Mr. Field said in conclusion, "that we will succeed in obtaining an Anglo-American tribunal, but we might have an agreement such as is already inserted in some treaties, that disputes respecting the interpretation of a treaty shall be referred to arbitration."

August Zippelius, ex-caterer to mad King Ludwig of Bavaria and peddler of poisonous recipes to Philadelphia bakers, was lodged in a Philadelphia jail, charged with causing a large number of deaths during the past year by adulterating food with chrome yellow. In several instances lead poisoning was suspected. "I sold chrome yellow in Europe," he said. "There's no law against it there. I have not done anything wrong. I don't believe the King or anybody else in Bavaria was made crazy by eating chrome yellow." The man was discharged for want of evidence.

Some of the largest syphon centrifugal pumps ever made have just been furnished San Francisco for use in reclaiming lands along the Sacramento and San Joaquin Rivers. These pumps have a capacity of nearly 38,000 gallons per minute at a lift of eleven feet seven inches, the engine being of 156 horse-power. The coal consumed is 4 4-10 pounds an hour to each horse-power.

MECHANICAL.

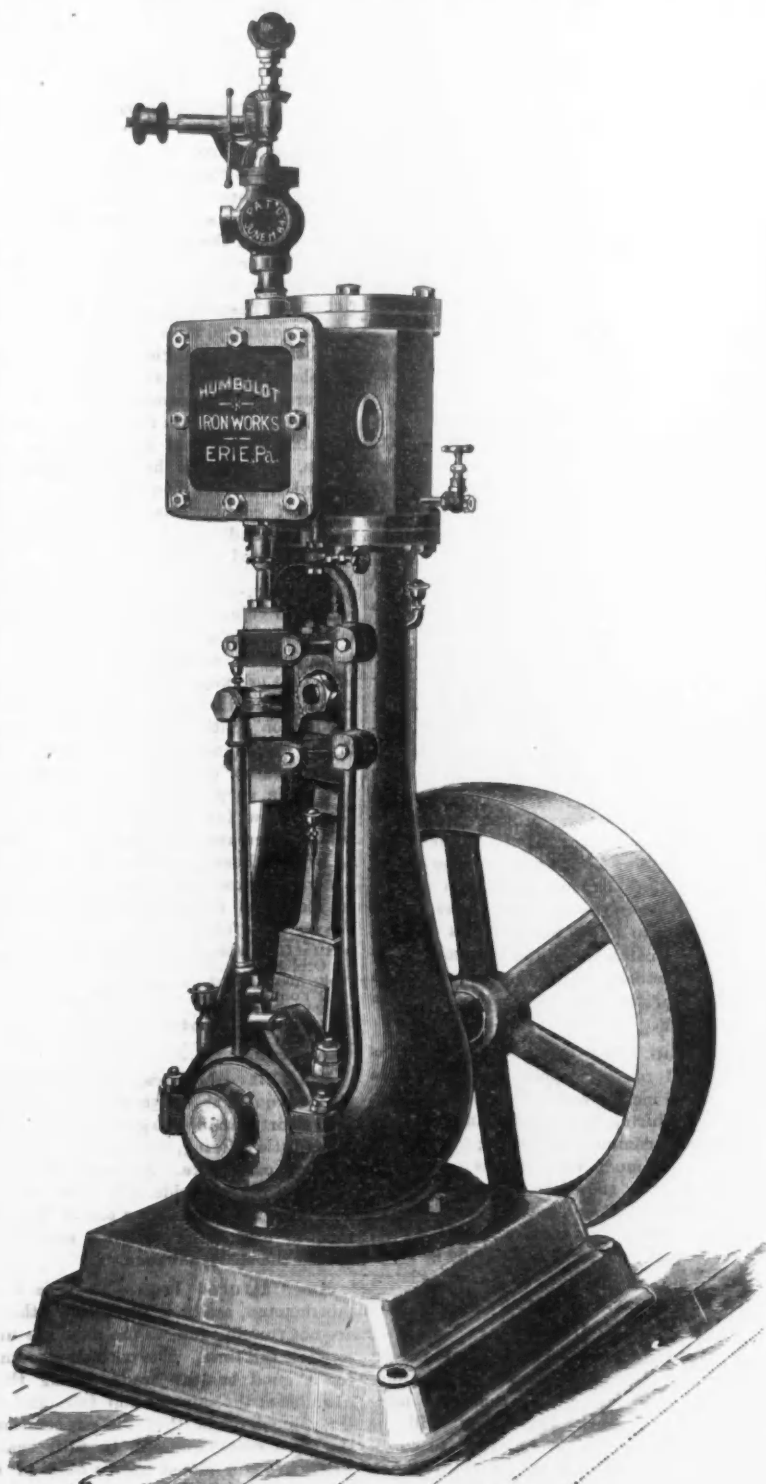
A New Vertical Engine.

Small, well built engines of simple design and of a comparatively high degree of efficiency have of late years received increased attention, and a number of different types have been put on the market. One of the latest, built by L. D. Davis (Humboldt Iron Works), of Erie, Pa., we show in an engraving on this page. The engine is vertical, and has been designed with special reference to economy of fuel and maintenance. The bearings are large, and have provision for taking up wear. There is a

tons. The iron crate which handles these guns weighs about 120 tons. It moves forward and back on tracks laid in the lathe-room, and the overhead gearing of the crane can be swung in any direction or position desired. These immense gun lathes have been at the South Boston Iron Works since 1882. One of them was built there and the other at the Springfield Arsenal.

Pneumatic Machinery at the Paris General Post Office, France.

In the *Annales Télégraphiques* an interesting account is given of the pneumatic machinery at the general post office, at Paris. Two sets of machinery, it appears, have



VERTICAL ENGINE, BUILT BY THE HUMBOLDT IRON WORKS, ERIE, PA.

wrought-iron shaft, steel piston-rod, valve-stem and cross-head pin. The piston is fitted with self-adjusting packing, and the clearance is reduced to 1/16 inch at each end of cylinder. The engine is perfectly balanced, can be run at a high rate of speed and upon upper floors with perfect safety, and is claimed to be especially adapted to small electric light plants. It is fitted up with a link, when desired, for marine use. All parts are made in duplicate and are interchangeable. A steam test is made of every engine before it leaves the works, and all necessary adjustments are carefully made, so the engine is ready to run as soon as placed in position. It is turned out in sizes of 6, 8, 10 and 12 horse-power.

Gun Lathes at the South Boston Iron Works.

The two large iron gun lathes at the South Boston Iron Works are being prepared for removal to the Watervliet Arsenal, West Troy, N. Y., under orders from the Ordnance Department at Washington. The great iron crane, which is used to place the guns in position on the lathe, will also be taken away. It is apparently the intention of the Government to make the Watervliet Arsenal the great gun foundry of the country, and to hereafter do all of its own large gun casting. Pits are now being prepared at that arsenal for gun casting, and in addition to the lathes and crane which are to be removed from South Boston, a number of rifling and boring machines and other machinery are to be shipped there from the Watertown Arsenal. The two iron gun lathes which are to be removed from the South Boston Iron Works are the largest in this country, and among the largest in the world, and are two of the most wonderful pieces of machinery in America. Each lathe is about 90 feet in length; one weighs about 175 tons and the other about 145 tons. Each lathe is capable of turning a piece of work 40 feet in length, and on the other hand, to do work of extreme delicacy and lightness. Each is, in fact, a perfect and completely fitted lathe. They have been used in South Boston for finishing the 12-inch guns, which are 385 inches in length, and when they came upon the lathe weighed 120 tons each and were turned down to 54

been arranged in the basement of the post office—one hydraulic, the other pneumatic. In the hydraulic apparatus the water is under a pressure of 50 atmospheres, and by its aid four elevators are worked, the supply of water for ordinary and fire purposes is maintained, and the waste water is dumped into the sewers. The pneumatic machinery compresses and rarefies air for a portion of the pneumatic dispatch of Paris—namely, for two 12-inch mains connecting the post office with the telegraph office at the Bourse, the center of the Parisian system. Both sets of machinery are in duplicate.

The work done by the pneumatic machinery is to force more than 1000 cubic feet of atmospheric air per minute into reservoirs containing air at a pressure of 53 1/2 inches of mercury, and also to exhaust into the atmosphere a like amount taken from reservoirs of rarefied air where the pressure is 10 inches of mercury. In the exceptional case of trials, the engines had to compress the air to a pressure of four atmospheres and to rarely it to a pressure of 4 inches of mercury. It was specified that the temperature of the compressed air should never be more than 36° F. higher than that of the air taken in from outside. Two Corliss steam engines are fixed, and there is room for a third. The water needed for the condensation of steam is got mainly from two Artesian wells; but there is an automatic arrangement by which, if the supply from the wells fails, water can be turned on from the city mains. The compression and rarefaction of the air takes place in two cylinders placed in a line with each other and with the steam cylinder, their pistons being a prolongation of the steam-cylinder piston. At each end of these cylinders are 60 phosphor-bronze valves, which have the advantage of not being injured by the high temperature of the water, as india-rubber valves would be. There is some difficulty in cooling the compressed air that is passed into the mains. Such cooling is necessary because the warmer air contains a large quantity of watery vapor, some of which, even in summer time, may be condensed in the mains. From this cause the rails have been made rusty and the dispatches soiled. In winter the case is worse, for then condensation takes place where the pipes come

near the surface and ice is formed, to remove which it may be necessary to open up the ground and disconnect the pipes. By using the same air as much as possible over and over again this presence of moisture may be lessened, but the pressure of the compressed air is thereby sensibly diminished, and consequently the trains go slower.

The pipe that admits the atmospheric air is connected with a chimney 16 feet high, because the air near the ground is always nearer the point of saturation than air higher up. Cast-iron flanged pipes, 12 inches internal diameter, connect the compressing cylinders with the air reservoirs. In consequence of the small height of the basement the four pipes (two suction and two exhaust) are placed in the same horizontal plane. To avoid awkward bends where two pipes, A and B, cross, a short portion of A is very much enlarged, B passes through A without change of section, the water in A passing above and below the pipe B, and the axes of each pipe thus remain in the same horizontal plane. There are three reservoirs for compressed air and one for rarefied air; each holds about 2500 cubic feet. Bourdon gauges are placed in the center of the engine-room to give the various pressures, and there are besides gauges which mark a continuous register on a cylinder moved by clockwork. Between midnight and 7 a. m. there is much less work, the trains only running every quarter of an hour, and it is found more economical to use a special auxiliary engine during these hours than to run one of the Corliss engines even at a very slow pace. These compressors have worked so well hitherto that it is probably that the machinery in use at the seven other pneumatic stations in Paris will be removed and machinery of this kind adopted.

The Mulhouse Monster Lathe.

One of the finest and most powerful tools that mechanical science has yet achieved has just been finished at Mulhouse for the French navy. It is a two carriage universal lathe, which is a complete machine shop in itself, being capable of performing the most varied operations—such as mortising, shaping, boring and molding—with the most perfect accuracy. It is wonderfully adapted to the delicate and complicated working of pieces for armor-plating turrets, of helix supports, of rudders, crank shafts, pistons, &c., for modern war vessels. Its weight is more than 340 tons, and it is driven by an engine of 25 horse-power. Comparison of this tool with one of 76 tons, which was a mechanical marvel some 25 years ago, gives a striking illustration of the almost incredible progress of our generation. Engravings of the lathe were given a short time ago in *Le Génie Civil*.

Grease as a Lubricant.

M. Bessard has communicated to the *Comptes Rendus* some interesting facts with reference to grease for the lubrication of machinery. The conditions such grease should fulfill are: It should be sufficiently fluid to penetrate, under slight pressure, to all parts of the bearings to be lubricated, but it must not exude without such pressure. Its melting point must be sufficiently low in order that a moderate amount of heating in any bearing (60° C. at most) may lead to its liquefaction. The use of grease is said to increase slightly the coefficient of friction. Two qualities of grease were found in the market, and a third, which has given excellent results, was compounded in accordance with the recipe hereafter mentioned. The form of lubricator was that in common use. On the first change from oil to grease it was almost invariably found, in spite of every precaution, that the bearings heated slightly, but this heating quickly disappeared when the oil grooves were made a trifle larger. Grease is now used by M. Bessard for every purpose except for the slide-valves of the engines, for which only oil can be employed. The saving obtained in various cases is specified; thus on the bearings of a large ventilating fan, 9 meters in diameter, where the amount of oil formerly used was 65 kg. per month, the consumption of grease and oil is now 5 kg. of the former and 17 kg. of the latter. For the whole works for 300 days the consumption was as follows:

	Cost.
First period. Olive oil only used, 1726 kg.	Francs. 1,500
Second period. Olive oil only used, 350 kg.	365.90
Grease only used, 60 kg.	

Saving 1,134.10
or at the rate of 77 per cent.; it will be seen that 60 kg. of grease, costing 44 francs 30 centimes, replaced 1376 kg. of olive oil.

On another comparative trial of oil and grease, extending over 300 days in each case, a saving of 62 per cent. was obtained.

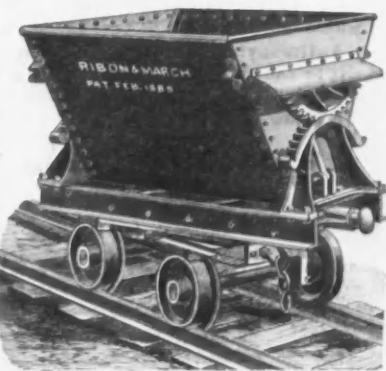


Fig. 1.—Swivel Car.

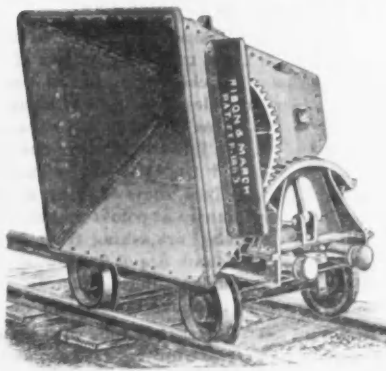


Fig. 2.—Side Dumper.

IMPROVED MINE CARS, BUILT BY RIBON & MARCH, JERSEY CITY, N. J.

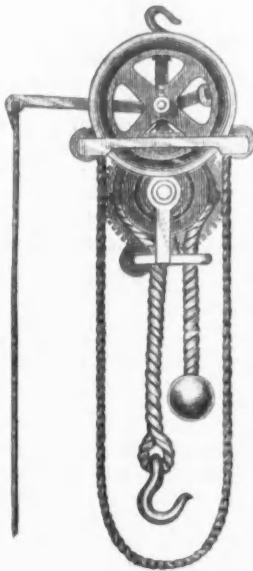
An account of the nature and cost of each description of grease is given, as also of the process of making the grease manufactured by M. Bessard, the composition of which was as follows:

	Per 100 kg.	Francs.
Olive oil	25 kg. at 90 francs =	22.50
Tallow	52 kg. at 77 francs =	39.94
White soap	16 kg. at 61 francs =	9.76
Soda crystals	2 kg. at 12 francs =	0.24
Water	8 kg. at . . . francs =	
Total		100 francs = 67.44

or about 6 cents per pound.

Portable Rope-Hoist.

We show in the annexed cut a portable rope hoist, put on the market by the Energy Manufacturing Company, 1115-1123 S. 15th street, Philadelphia, Pa. It is specially designed for use where only one man is available for lifting from 300 to 2000 pounds, the use of rope instead of chain making it easy to handle. The rope will last for years, and when worn out will cost only a small sum to replace. The wheels, moreover, can be made lighter than for chain hoists. The hand rope is independent of the lift-rope and can be worked at any angle. The hoist has been in use for several years and has given entire satisfaction. The ropes cannot kink, as they undergo a special process before they are spliced. The hoist is fitted with a swivel hook, by which it can be attached to any support. The machine simply consists of a frame between which are placed a pinion gear and binding yoke. The hand rope wheel, upon which the automatic brake acts to prevent any accidental lowering of the load, is placed outside the frame. The binding yoke, which is placed above the pulling wheel, binds the rope into the sprockets of the latter and prevents its raising, which would cause the slipping of the rope, and also does away with the use of a



Portable Rope-Hoist, Made by the Energy Mfg. Co., Philadelphia, Pa.

drum for rope to wind around. At the bottom of frame is placed a shive wheel which is to make the load pull in line with hook placed at the top of the frame. The hoist cannot lower except when brake-rope is pulled upon. The automatic brake which is used will hold a load at any point, and will allow the operator to lower quickly or slowly by simply pulling on the brake-rope. The shafts in the hoist are made of steel, and the frame of malleable iron.

Improved Mine Cars.

Within the past two years Messrs. Ribon & March, 144-146 First street, Jersey City, N. J., have effected several important improvements in their mine cars, their latest form being shown in the accompanying engravings. The first dumping device adopted by them was a car with three trunnions, which, it was found, was too hard to operate. Then they devised a segmental gear which was a great improvement; but there was still some trouble, as stones and dirt would get in the teeth while loading. To avoid this, a protecting hood was arranged. A false bottom, which could readily be renewed, was also added to take up the wear in the stone-box, and the cars were further fitted with bumpers, permitting their use in train, and with latches to hold the car boxes in position when dumped. Finally a simple brake was provided which is found useful on uneven tracks. The cars are made entirely of iron, or the greater part of steel, as desired. The swivel cars, shown in Fig. 1, are of 2 foot gauge and 15 cubic feet capacity (equal to 1 ton quartz); the body or box is 39 x 41 inches, and stands 42 inches high on the track; total weight, about 875 pounds. The side dumpers, Fig. 2, have the same capacity as the swivel, but stand only 33 inches high on the track, and weigh about 800 pounds complete.

The Boston Advertiser says the grand jury has indicted F. A. Houliette, of Houliette & Dannels, metal importers, of that city, for

perjury, undervaluation and fraud by false invoices. This is the only prosecution of the kind which has ever been made, and is a direct result of the work of the Boston movement against undervaluations and the active co-operation of leading custom-house and Government officials.

A new metal figure of "Justice," to replace the fine goddess which has adorned the New York City Hall for 28 years, would cost \$6500. The old one was 12 1/2 feet high.

Trade Report.

NEW YORK.

American Pig.—The market remains quiet, although quite a number of sales of lots of 500 tons and upward are reported, chiefly for delivery during the last quarter of the year. Among these is one lot of 500 tons of Southern Iron at private terms. In addition thereto there were many small orders, but as yet no strong indications that a general buying movement has set in. Nor is it expected for some weeks to come. Forge Pig is irregular, the local trade being small. Some foundries take a little of it for large castings. There have been sales of small round lots at prices ranging from \$17 to \$18.50 at tide water. We quote standard brands No. 1 Foundry, \$21 @ \$21.50; No. 2 Foundry, \$19.50 @ \$20.50, and Gray Forge, \$17 @ \$18, with outside brands of Foundry Irons available at 50¢ @ \$1 less.

Scotch Pig.—There is not much doing, the principal buyers being well covered for the near future, although inquiries for a few round lots continue to come up. We quote: Coltness, \$22.50 @ \$22.75; Glen-garnock, \$20.75 @ \$21.25; Shotts, \$22 @ \$22.50; Gartsherrie, \$21 @ \$21.25; Carn-brook, \$21 @ \$21.25; Summerlee, \$22 @ \$22.25; Dalmellington, \$20.50 @ \$20.75, and Eglington, \$20. @ \$20.50.

Spiegelisen and Bessemer Pig.—No business is reported in either, and quotations for Foreign remain nominally \$26.50 @ \$27 for 20 % Spiegel.

Bar Iron.—The market is quiet, with some mills withdrawn, filling contracts. We quote Common, 1.8¢ @ 1.9¢; Medium, 1.9¢ @ 1.95¢, and Refined, 1.95¢ @ 2.25¢, on dock.

Structural Iron.—The mills report being full of business, and time of delivery is becoming an important question in all transactions. We quote for large quantities: Angles, 2.40¢ @ 2.50¢; Tees, 2.70¢ @ 2.75¢, and Channels and Beams, 3.30¢, base on dock.

Plates.—Orders for near by delivery are difficult to place, and a number of mills are asking considerably higher prices. We quote for round lots of Common or Tank, 2.35¢ @ 2.50¢; Refined, 2.50¢ @ 2.60¢; Shell, 2.6¢ @ 2.8¢; and Flange, 3.5¢ @ 3.8¢; Extra Flange, 4.25¢ @ 4.50¢. For Steel Plates quotations are as follows: Tank, 2.75¢ @ 2.9¢; Ship, 2.9¢ @ 3¢; Shell, 2.9¢ @ 3.15¢; Flange, 3.25¢ @ 3.50¢, and Fire-Box, 3.75¢ @ 4¢, on dock.

Billets and Blooms.—There have been a few sales of moderate lots. We quote \$30 @ \$30.50.

Wire Rods.—During the past three days a sudden advance has taken place in Wire Rods, which, it is stated, is due to the fact that the long dullness has led some of the German Rod mills to stop rolling Rods, and to the prospect of the formation of a combination in Germany. There have been sales aggregating several thousand tons during the week, and the market closes with sellers asking \$41.50, buyers to take risk of duty.

Steel Rails.—During the week an Eastern mill sold 28,000 tons of Rails to the Huntington roads for Pacific Coast delivery at private terms. Since the seller was forced to meet foreign competition, English Rails being quoted for San Francisco delivery at \$44 @ \$44.50, the sale must have netted at mill somewhat less than current prices. It is an important transaction, however, as showing that at least one mill is ready to make some sacrifice to keep foreign Rails out of the Pacific Coast market, which it was generally supposed was practically given over to European makers. One advantage of the sale is that it is largely winter work, which the mills are usually willing to make concessions to secure. Few other sales are reported, among them a lot of 2000 tons, October delivery, to go to Virginia. We quote \$38.50 @ \$39 for early delivery, \$38 @ \$38.50 for fall, and \$37.50 @ \$38 for late fall and winter work.

Old Rails.—Transactions confined to an aggregate of about 1000 tons in lots of 200 and 300 tons, are chiefly put to Ore dealers and holders, no sales to consumers being reported. The prices at which these transactions are said to have been made fluctuate between \$25 and \$24, the entire quantity being American Tees, some of them at New England ports, others at points on the Hudson River. Holders are asking from \$23.50 to \$24 for Tees, and \$24 @ \$25 for Double Head, but consumers quite generally hold these figures to be above their views.

Scrap.—This market is dull, with holders asking \$20.50 @ \$21 for Yard Scrap, and no transactions of any consequence reported. There is a fair stock at this point.

Railroad Fastenings.—Spikes are quoted 2.40¢ @ 2.50¢ net; Angle Fish Bars, 2.1¢ @ 2.25¢; Steel Angle Bars, \$2.20 @ \$2.30; Bolts and Nuts 3¢ @ 3.20¢, and Bolts and Hexagon Nuts 3.2¢ @ 3.30¢.

Metal Market.

Copper.—This market has been extremely strong and active during the past week, transactions openly and on the quiet having amounted to 1,500,000 lb. at from 10.55¢ to 10.65¢ for spot and July delivery, 19.60¢ @ 10.75¢ for August and

10.80¢ @ 10.85¢ for September, October and November deliveries, closing with buyers at the top of the market, and with only a few sellers at 10 7/8¢ @ 11¢. Large investments are being made in Copper, and Wall street capital is paying for spot and near future deliveries for actual investment. We understand that further unexecuted orders for spot July and August deliveries are in the market for the same interest. Rumor says that 5,000,000 lb. are wanted for the parties operating. We hear that an Arizona Copper company who are capable of turning out 5,000,000 lb. of fine Copper have been idle for some years are about to resume operations. The consolidation of the Mountain View properties with those of the Montana Copper Company, the Colusa and adjoining claims, makes a strong and most powerful combination, especially in connection with the Tamarack and Osceola on Lake Superior. We understand that the new management will carry on business in the same conservative manner, and not overwhelm the market with Copper, though it is claimed that it could make cheaper copper than the Anaconda. The Anaconda Ores average 7% Copper, while the Mountain View and Colusa Ores average 14 %, having both besides in reserve large quantities of Copper glance. It will take several months before the old Montana Copper Company's plant can be started. Best Selected is cabled from London £44. 15/, and Chili Bars declined from £39. 17/6 on the 14th inst. to £39. 15/ on the 15th and 18th, in order to recover £39. 17/6 this morning.

Tin.—Our market during the week under review has been strong; Spot Tin remains scarce at 23 1/4¢ @ 23 3/4¢ in lots of 10 tons and over. For July 23.10¢ is being bid and refused, now held at 23.20¢; August 22.90¢ buyers; September, at 22.85¢; October, 22.75¢. Transactions to the extent of about 250 tons have taken place, besides some large round lots by private contract. London has steadily moved upward, reaching £100. 5/ Spot, and £103. 10/ Futures. About 1000 tons of Spot Tin bought some three months ago from the bear party in London at low prices are being paid for this week by a French Syndicate, and we understand that early in August a further large line is falling, one which will be taken up at maturity. There is evidently a large operation in process of development on the other side. Consumers are entirely bare of stock, and the longer they delay their purchases here, the more they will find out their mistake. Tin Plates.—A fair demand for Tin Plates on the spot has prevailed, and, with the light stocks available, prices remain stiff, Terns and Coke in particular being scarce. Futures are higher, in response to the firmness at Liverpool, where stocks are running exceedingly low, the drought in Wales continuing unabated so far. We quote at the close, 7 box, large lines: Siemens-Martin Steel, Charcoal Finish, \$4.80 @ \$5.25; Coke Finish, \$4.65 @ \$4.70; Charcoal Terns, \$4.35 @ \$4.55, and Coke Terns, \$4.45 @ \$4.55. Liverpool cables Coke 13/6.

Lead.—Lead has again been stiffening out West, and in consequence thereof Eastern people have taken courage, resulting in sales of 300 tons Newark, spot, at 4 1/2¢, and 200 tons ditto, futures, at the same figures. At the close 4.60¢ is asked all round, and Refined may nominally be quoted 4.65¢. St. Louis and Chicago are 4.40¢ and 4.45¢ respectively, equal to 4.62 1/2¢ and 4.65¢ laid down here. London meanwhile cables Soft Spanish, £11. 15/, and English Pig, £12. Manufacturers of Lead may be quoted in this city as follows: Pipe, 7¢; Sheet, 7 1/4¢; Tin-lined Lead Pipe, 15¢; Block Tin Pipe, 40¢; Drop Shot, \$1.40; ditto, 5 lb, 33¢; Buck and Chilled, \$1.65; ditto, 5 lb, 38¢—all less the usual trade discount.

Spelter and Zinc.—Rather more inquiry has been observable for Common Domestic Spelter, which is now worth \$4.60, while Silesian may be nominally quoted at \$4.85, being cabled as heretofore, £14. 12/6. In the meantime from London we quote Bertha Refined 8¢.

Sheet Zinc.—Is unaltered at 6 1/4¢ @ 6 3/4¢, with a fair demand.

Antimony.—Hallett rose in London from £35 to £36; we quote the same with a fair demand, 8 1/2¢ @ 8 3/4¢ here, while Cookson is bringing 9 1/4¢.

New York Metal Exchange.

The following sales are reported:

THURSDAY, July 14.	
10 tons Tin, August.....	22.85¢
25,000 lb. Lake Copper, spot.....	10.55¢
50,000 lb. Lake Copper, July.....	10.55¢
25,000 lb. Lake Copper, August.....	10.65¢
250,000 lb. Lake Copper, Oct.-Nov.....	10.85¢
FRIDAY, July 15.	
10 tons Tin, August.....	22.85¢
30 tons Tin, October.....	22.70¢
TUESDAY, July 19.	
50,000 lb. Lake Copper, second half of Aug. 10.70¢	
25,000 lb. Calc. Heli. Copper, second half of October.....	10.95¢

Philadelphia.

Office of The Iron Age, 230 South Fourth St., PHILADELPHIA, July 19, 1887.

Pig Iron.—There is very little change to report, the demand being fairly active at about last week's prices. The attempt to advance quotations of Mill Irons has not been very successful, although if the demand holds out as seems probable, buyers may yet have to give in. This does not imply that the market is weaker, it simply means that

some odd lots of good Mill Iron were found to be available at about \$17.50, delivered, and so long as that continues it will not be easy for others to get \$18. The tendency appears to be in that direction, however, and it would be a difficult matter to secure any considerable quantity of good iron without paying at least some advance on \$17.50, if not the full \$18. Foundry Irons are firm and scarce, good brands of No. 1 particularly so. Prices are not notably dearer, but it is easier to get comparatively high figures for favorite brands, while there are fewer lots that can be had at concessions from quoted rates than was the case a few weeks ago. The usual quotations for good No. 1 is \$21 @ \$21.50, and about \$22 for special brands. No. 2 Foundry is also in fair demand, and is generally quoted at \$20 at tide, although a good deal of business is done at \$19.50, and even \$19, when a large lot can be placed, and the brand is not fully up to the usual requirements. Taking the week through, we should call it favorable to holders, and although as we have said, no advance has been established, prices are certainly very firm.

Foreign Iron.—One or two large transactions have been brought to a close, and 25,000 tons Bessemer taken at prices not definitely known, but said to be at about \$20 c.i.f., duty paid.

Blooms.—There is not much demand, and asking prices are about same as last week, say: Rail Blooms, \$30 @ \$31; Nail Slabs, \$30 @ \$31; Sheet-Iron Billets, \$32 @ \$34; Charcoal Blooms, \$53 @ \$54; Runout Anthracite, \$45 @ \$46; Scrap Blooms, \$38 @ \$39 1/2 "bloom" ton.

Muck Bars.—Business is rather quiet, with sales at prices varying from \$31.50 to \$32 at mill, according to quality and delivery.

Bar Iron.—The demand keeps up very fairly, and, while there is nothing unusually large on the market, there is sufficient business to hold prices firm and steady. Manufacturers are still endeavoring to get prices back to 2.1¢, but it is pretty slow work at present, although some of the best makes command that figure. There is plenty of iron to be had at from 2¢ to 2.05¢ however, but the feeling is such that, with a very slight increase in the demand, prices would easily stiffen to 2.1¢. Skelp Iron is wanted, but at 2¢ local makers find themselves underbid by others at a distance, although orders for probably 2000 tons were placed in this vicinity.

Plate and Tank Iron.—The demand is quite equal to the supply, and prices are pretty well maintained. The mills filled up with work during last month, and as they have hardly commenced making deliveries, there is not much room for new business. The position is therefore practically about what it was a week ago, and prices as follows: Ordinary Plate, delivered, 2.25¢ @ 2.30¢; Tank, 2.35¢ @ 2.40¢; Shell, 2.6¢ @ 2.7¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank, 2.5¢; Shell, 3¢ @ 3.2¢; Flange, 3.3¢ @ 3.4¢; Fire-Box, 3 3/4¢ @ 4¢.

Structural Iron.—The demand is about an average one, but orders have accumulated to such an extent that the mills have all the work that they will be able to handle for a long time to come. Prospects are favorable for a continuance of orders, so that, on the whole, the position is considered a very strong one. Prices firm as quoted before—viz., 2.4¢ @ 2.5¢ for Bridge Plate; 2.30¢ @ 2.35¢ for Angles; 2.8¢ @ 2.9¢ for Tees, and 3.3¢ for Beams and Channels.

Sheet Iron.—The demand is quite active and all the mills fully employed. Prices are a little irregular, but for good makes are quoted about as follows:

Best Refined, Nos. 26, 27 and 28.....	3 1/4¢
Best Refined, Nos. 18 to 25.....	3 1/4¢
Common, 1/4¢ less than the above.....	4¢ @ 4 1/4¢
Best Bloom Sheets, Nos. 22 to 25.....	4¢ @ 4 1/4¢
Best Bloom Sheets, Nos. 16 to 21.....	3 1/4¢ @ 3 3/4¢
Blue Annealed.....	2.8¢ @ 3¢
Best Bloom, Galvanized, discount.....	60 ¢
Common, discount.....	65 ¢

Steel Rails.—There is no special change of feature to notice, unless it may be a little more disposition to accept orders for winter delivery at a trifle less money. The mills have an abundance of work for the present, and if Foreign Rails can be kept out may have for a long time to come, and to secure that prices are being shaded a little. Summer deliveries are held at \$39 @ \$39.50 at mill; fall and winter, \$38 @ \$38.50, with important contracts in prospect at about these figures, possibly a shade less on certain deliveries.

Old Rails.—There are no sales to report, as buyers and sellers are still a good way apart in their ideas of value. The asking price to day is \$25 for T's in store, \$24 for shipments, and \$24.75 for shipments of Bridge Rails. Offers are made at about \$23 and \$24 for shipments of T's and Bridges.

Scrap Iron.—Quiet and unchanged at about the following prices: Cargoes of No. 1 Scrap, \$21 @ \$22; small lots, tide-water delivery, \$22 @ \$22.50; Selected do., \$23; No. 2 do., \$16 @ \$17; Turnings, \$15 @ \$16; Old Car-Wheels, \$17.50 @ \$18.50; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$16 @ \$17; do. Borings, \$12 @ \$13; Old Fish Plates, \$26 @ \$27.

Wrought-Iron Pipe.—Business remains in a very unsatisfactory condition. Jobbers are cutting rates to secure business, and mills are making their own prices, as they have been doing for some time past,

totally ignoring the association price list. Discounts are as follows: Lap-Welded Black, 50 %; Lap-Welded Galvanized, 32 1/2 %; Butt-Welded Black, 32 1/2 %; Butt-Welded Galvanized, 22 1/2 %; Boiler Tubes, 42 1/2 %.

Nails.—Are quiet, and prices range from \$2.15 to \$2.25, according to specification. The outlook is encouraging, and mills anticipate a large fall trade, and at improving figures. The Eastern Association hold their meeting here on the 20th inst. No important change in card rate is expected, as the market is not in a position to warrant it, although it is possible some changes will be made.

Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, PA., July 19, 1887.

The general iron business has been without important change during the past week. There has been a considerably improved volume of business in Pig Iron and a diminished trade in the products. The falling off in the latter was caused by the excessively hot weather, the men being unable to work full time. There is no falling off in demand; on the contrary, it is increasing, but with the thermometer ranging from 90° to 102° in the shade it is not strange that the iron workers had to succumb. The general outlook is improving as regards all Pittsburgh manufactures, and in the course of a few weeks, or as soon as the weather cools down somewhat, so that men can work with some degree of comfort, many of our manufacturers now standing still or working part time will be started up full.

Pig Iron.—There has been a considerably increased volume of business the past week, sales of some 10,000 to 12,000 tons having been made publicly, and there are no doubt many sales that are kept private. That the market is firmer is very generally admitted. Production continues light, while consumption is large, and will be increased as soon as the weather cools off. The supply in this district is very much reduced; it has not been so low for a number of years, but it will be increased now that the Coke strike is over. Bessemer has advanced from 50¢ to \$1 1/2 ton and is very scarce. A sale of 1000 tons is reported at \$22.50, cash. We quote as follows:

Neutral Gray Forge.....	\$18.00 @ \$19.00, 4 mos.
All Ore, Mill.....	19.50 @ 20.50, 4 "
White and Mottled.....	17.00 @ 17.50, 4 "
No. 1 Foundry.....	21.00 @ 21.50, 4 "
No. 2 Foundry.....	20.00 @ 20.50, 4 "
No. 1 Charcoal Foundry.....	23.50 @ 24.00, 4 "
Cold Blast Charcoal.....	25.00 @ 26.00, 4 "
Bessemer Iron.....	22.00 @ 22.50, 4 "

Muck Bar.—Is in scant supply and firmer; we now quote at \$31.50 @ \$32.50, cash, for Cold Short, inclined to good, Neutral. There is but little offering, and mills running want all they can make. As stated in a former report, it costs considerably more under the new wage scale to make a ton of Muck, and this, in connection with the scarcity, has caused the sharp advance.

Manufactured Iron.—There is a very fair demand, and it is increasing; the mills are not running full, as the men are unable to work full time. The outlook is promising for a good healthy trade during the remainder of the summer and fall, and there is not much doubt that the expectations of the more reasonable will be fully realized. Prices are still quoted upon a basis of 1.90¢ @ 2¢ for Bars, 60 days, 2 ¢ off for cash.

Nails.—There has been a little more inquiry during the past week and a firmer feeling obtains. So far as we can learn there are now no sellers under \$2, 60 days, 2 ¢ off for cash. Manufacturers not very far west of Pittsburgh, who were selling as low as \$1.90, and even \$1.85, have discovered that there was no profit at the prices in question, and they are refusing to sell below the quotation first named. The project to consolidate the Eastern and Western Nail Associations has not yet been consummated, and it is doubtful whether it will be done, but it would certainly have a good effect. If there was a national association taking in all the manufacturers in the country the business could be placed in much better condition. Then its production could be regulated so as to be governed by consumption and remunerative prices would thereby be realized. It is claimed that there are enough machines to make sufficient nails to supply the whole civilized world. Still, every now and again we hear of the construction of a new factory, just as if there was no limit to the demand.

Wrought-Iron Pipe.—There has been no change during the past week. Manufacturers continue to report that business is in a most unsettled and unsatisfactory condition; and until the Pipe Association is revived there is not much prospect of improvement. As it is now, scalping is the order of the day. There is no uniformity of prices, and the rates obtainable afford little or no margin for profit. So unsatisfactory is the business that some manufacturers are not soliciting orders, preferring in the present condition of affairs to do just as little as possible. It is impossible to quote prices, as each firm makes its own rates. As there are only 13 Wrought-Iron Pipe mills in the country, it would naturally be supposed that an organization could easily be held together, but such is not the case.

Old Rails.—The market for Old Iron Rails is still reported firm, and quotations may be given at \$26 for Foreign Tees, and \$27 for Double Heads; we can report sales of 2000 tons, at \$26 and \$27, delivered at

Youngstown, Ohio; also a sale of Tees here in Pittsburgh, at \$26.25. There is considerable inquiry for Old Steel Rails, with scarcely any to be had.

Steel Rails.—Heavy sections are still quotable at \$39 @ \$40, cash, at mill.

Billets, &c.—The market for everything in this line is firmer, in sympathy with Bessemer Pig. Sales of 500 tons Billets at \$32, and 1000 tons Nail Slabs at \$31, both sales showing an advance of \$1 1/2 ton within a few weeks. Crop Ends, \$22.50 @ \$23, and Bloom Ends at \$21.50 @ \$22.

Railway Track Supplies.—Railway Spikes remain unchanged at 2.60¢, 30 days, delivered; Splice Bars at 2.10¢ @ 2.20¢, and Track Bolts at 3.40¢ with Hexagon and 3.30¢ with Square Nut.

Old Material.—There is a fair business, and prices are firmer. No. 1 Wrought Scrap, \$20.50 @ \$21, net ton; Wrought Turnings, \$15 @ \$16; Car Axles, \$25 @ \$26; Cast Scrap, \$18 @ \$19, gross; Cast Borings, \$12.50 @ \$13; Old Car Wheels, \$20.50, gross.

Chicago.

Office of The Iron Age, 95 and 97 Washington St., CHICAGO, July 18, 1887.

The condition of the Iron trade generally is quite encouraging to manufacturers. The demand for almost all kinds of Iron and Steel is not only very good, but indications favor an improved business in most lines during the remainder of this month. This is the time of the year at which large contracts are placed by many consumers, but in addition to these annual purchases an increased movement is in progress among other classes of buyers.

Pig Iron.—There is a continued active demand, with an increasing scarcity of iron. During the past week large quantities of Charcoal Pig Iron have been sold in the territory tributary to this market, including some round lots of Southern. Some of the agricultural implement manufacturers have placed their orders for the season's supply, but others are still to be heard from, so that a large demand remains to be met from that quarter. The same remark can be made of the Car-wheel and Malleable Iron manufacturers. The scarcity of Coke Iron has brought into this market a number of brands not usually sold here. Among them may be noted Hocking Valley Iron from Ohio, which is meeting with a ready sale at good prices. Scotch Pig is also being brought in to some extent. Consumers cannot even get a supply of Southern Silvery, which is usually to be had at this time of the year without any difficulty. Soft Coke Iron is in very urgent request for immediate delivery. Orders are now being placed for all kinds of Coke Iron for future shipment, although some buyers are moving cautiously in this vicinity, believing that prices may be lower when the Coke strike is ended and the furnaces using that fuel resume active operations. Among the sales of the week were some large blocks of Bessemer Pig. Prices are firm as follows for cash, f.o.b. Chicago: Lake Superior Charcoal, Nos. 1, 2 and 3, \$23 @ \$23.50; Southern Cold Blast Charcoal, \$27; Hanging Rock and Jackson County Softeners, \$22 @ \$22.50; Straight Coke Foundry, No. 1, \$22.50 @ \$23; No. 2, \$21.50; No. 3, \$20.50; Coke Bessemer, run of furnace, \$22.50 @ \$23; Southern Coke, No. 1, \$22.50; No. 2, \$21.50; No. 3, \$20.75; Virginia Coke No. 1, \$22.50; No. 2, \$21.50.

Bar Iron.—A fair demand is reported from all classes of buyers. Prices are firm at 1.90¢ @ 1.95¢ for Common Bars, not guaranteed, in carload lots, f.o.b. Chicago. Good all Muck Bars are quoted at 2¢ @ 2.10¢ same delivery. Stocks in manufacturers' and merchants' hands are reported to be unusually low for this time of the year, and the prospects are regarded as excellent for higher prices. Stores are still quoting 2.15¢ @ 2.20¢ for Common, and 2.3¢ for good Bars.

Structural Iron.—The demand continues good for iron for bridge work, with prices the same as before. With the close of the Chicago building trades lockout, an improving demand is noted in building material for local consumption.

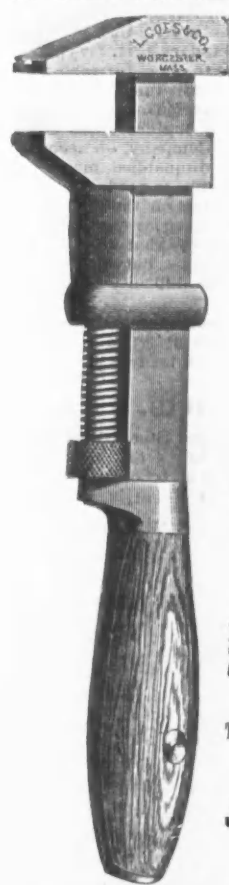
Plates.—A fair trade is reported for the past week, consisting principally of store orders. Some large orders in sight. Mills are gradually raising their prices, but local dealers are still adhering to their old rates.

Sheet Iron.—Manufacturers' agents are in receipt of further inquiries and can possibly sell a considerable quantity of iron if they are able to arrange for deliveries. Most of them are filled up to the 1st of November. Prices are firm at about 3.10¢ for No. 27 in carload lots at mill. Jobbers report a great deal of inquiry, but not many orders being placed at present, as people are holding off because prices have been advanced. No. 27 is now quoted at 3.5¢ from store; Nos. 25 and 26 at 3.40¢; No. 24 at 3.30¢.

Galvanized Iron.—Manufacturers' agents are still overrun with orders, which are fairly divided between light and heavy gauges. The active demand is causing them to expect prices to be advanced, but no changes have yet been made by either manufacturers' agents or jobbers. Jobbers report a good demand on some numbers.

Merchant Steel.—Some of the Agricultural Implement makers are appearing in the market with specifications for their an-

Hardware, Machinery, &c.
 Barker Bros., Machinery, case, 1
 Koeb, Hermann, Arms, cs., 17
 Burley, J. & Bro., Cutlery, cs., 3
 Field, Alfred & Co., Mddrs, cs., 13
 Olson, H. & D., Arms, cs., 6
 Hartley & Graham, Guns, cs., 2
 Lerch, Desp. Co., Arms, cs., 21
 Jewett's Sons, J. P., Guns, cs., 14
 Murphy, Alex. & Co., cs., 3
 Leonard & Shipman, Files, cs., 2
 Svensen & R. R. Co., Guns, cs., 3
 Traut & Farmer, cs., 4
 van der Toorn, W. H., Gun Barrels, cs., 5
 Liebusch & Hilger, cs., 11; Chaus, cs., 26
 Windmiller, L. & Roelker, Arms, cs., 4
 Witte, John G. & Bro., Cutlery, cs., 35
 Fright, Peter & Sons, Machinery, pkgs., 27



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PATENT
Screw Wrenches

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ESTABLISHED IN 1830.



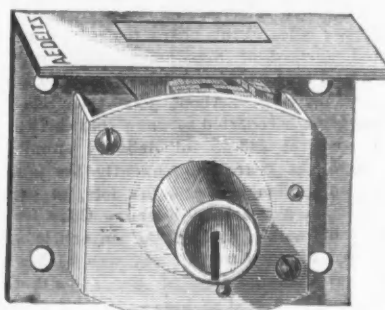
Sectional view illustrates our NEW
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Iron Frame and Shank of Bar keyed
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FOR SCREW IN JAW

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Send for Illustrated Price List and Circular.

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NEW YORK,
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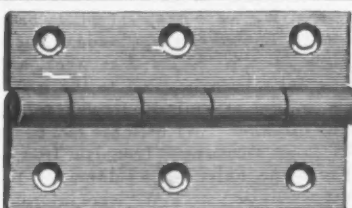
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Factory, BROOKLYN, E. D., N. Y.



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Manufacturers of
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Cheapness.
Made to any Length,
Width and Strength.
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Guaranteed to Run
Straight, Even Through-
out.
No Cross Joints, Un-
affected by Damp.
Clings well to the Pulley.
Has no equal. In fact,
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A composition or filling for Tools, Machin-
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Patent Portable Rope Hoist.

The best quick lift made. Quickest,
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Three sizes 500, 1000 and 2000 lbs. Just
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Send for descriptive circular and refer-
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ANY HARDWARE DEALER

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BUTCHER SAW BLADES

if he will take the trouble to show the Star Blades to the Butchers and per-
mit them to try their quality. There is not a single place where these Blades
have been used that they have not taken and held the market. They can be
sold for 10 Cents each, and that is less than the cost of filing a common
saw. They are so hard that one will cut three or four times as long as the
saws now in use without filing. As these Saws are not to be filed, and as
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wanted. They are listed on the 50th page of our new Catalogue which we
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Length.	Width.	Gauge.	Teeth to Inch.	Per Dozen.
14 and 16 in.	1 1/2 in.	24	9 1/2	\$1.08
18 " 20 "	"	24	9 1/2	1.20
22 " 24 "	"	24	9 1/2	1.32



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NATIONAL HORSE NAIL CO.,
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Pails,
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Keelers,
Milk Pans,



Spittoons,
Umbrella Stands
Water Coolers,
Slop Jars,
&c., &c.

Molded in one piece from wood pulp. Treated chemically, giving great
strength and durability, and at same time making the ware impervious to
liquids, hot or cold. Being neither painted nor varnished it will not impart
taste to anything put in it, and will not further absorb liquid or odor so as
to become heavier or foul. Is very light. Has no hoops to drop or rust off.
Warranted absolutely seamless and unaffected by extremes of weather.

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hard, the back being soft, thereby preventing them from breaking
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Saws on our recommendation, as we give them the option of re-
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Flexible Back Band Saws for Cutting Metals,

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"PEARLESS."

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W. J. WILDER'S PATENT, March 10th, 1885.

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We warrant these Faucets to be as represented,
measuring correctly and working more easily in
heavy molasses than any Measuring Faucet in the
market. No grocer can afford to be without them,
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sure perfect cleanliness, requiring no tin measures or
funnel to collect dirt and draw flies. They do not
drip. They prevent all waste, as no molasses or other
fluid can pass except when the crank is turned. They
are the embodiment of simplicity, and consequently
they are always in order. They work easily in the
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correctly, according to U. S. Standard.

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ALEXANDER BROS
BEST OAK BELTING
PHILADELPHIA.

Little Giant Meat Cutter.

The Peck, Stow & Wilcox Company, of New York City and Southington, Conn., have just brought out a new meat cutter, which they have designated as the "Little Giant." The general appearance of the device is shown in the first of the accompanying engravings, while the second shows the interchangeable parts belonging to it. The cutter weighs, complete with clamps, a little

used to convert it into a form suitable for mixture with bleached rags, as in the manufacture of paper. This wood pulp is mixed with water and stirred by an agitator and pumped into a mold, in the form of the outside of a pail, made of sheet brass, pierced with numerous minute perforations as close as possible over its whole surface. A rubber bag is inserted in the mold and distended by hydraulic pressure until the greater part of the water is expelled from the pulp; the rubber mold is then withdrawn, and the



Fig. 1.—Little Giant Meat Chopper.

less than 8½ pounds. All the parts are galvanized so as to avoid the nuisance of rust. The makers warrant the machine to cut 2 pounds of meat per minute, and assert that it does not tear, mash, or grind what is put into it; instead, it cuts it, and the small pieces are completely separated. Among the advantages claimed are, that it is composed of few pieces and is easily taken apart. This is evidenced by reference to the second engraving. The principle upon which the cutting is accomplished is strikingly unlike that of meat cutters in the past. The end of the barrel is stopped by a perforated head, held in position by a screw on the main shaft. The head is made to revolve with the main shaft by means of a pin that extends through the hub and which fits into a slot in the shaft. Immediately back of this plate three stationary knives are located, being let into the end of the barrel. Still further toward the interior of the ma-

brass outside mold separates, leaving a rough pail, similar in appearance to unbaked dough. It is dried at a temperature of about 100° F., and then trimmed and sand papered by automatic lathes invented for this purpose. The pails are dipped in raw linseed oil and then baked at a temperature of about 180° F., a process which oxidizes the oil, converting the rather fragile pulp into a tough substance resembling dry raw hide, and which will resist nearly every chemical of a corrosive nature used in the arts. After the treatment with oil the pail receives a coat of colored varnish or any other desired application to impart a more presentable appearance. Basins, trays, and similar articles of domestic use are made by this process, and a slight modification used in the manufacture of paper bottles. A wholly different method of using pulp, made from macerated straw, is used in the manufacture of paper barrels, which are tight

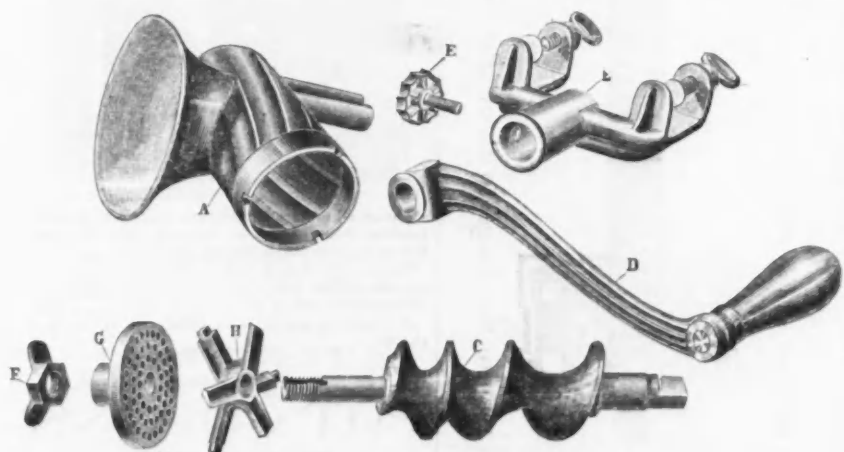


Fig. 2.—Little Giant Meat Chopper in Parts

chine are three other knives, sharpened in the opposite direction, however, and similarly fastened in the barrel. The second set of knives bear directly against the end of the worm, which as it passes around forces the meat from the hopper toward the end of the barrel. The meat in being forced in this way is carried around and is first partially sliced by the set of knives referred to. Going a little further, as it begins to be forced through the perforated end plate, it is still further cut by being drawn against the first set of knives above mentioned, and which work immediately against the inside surface of the plate. The novelty consists in the perforated plate revolving against the stationary knives. According to the manu-

and strong to resist internal pressure, but they are not as well suited to withstand the severe handling incident to transportation of liquids as the present form of casks.

The Rogers Improved Cutting Nipper.

C. Rogers & Bros., Meriden, Conn., are putting on the market an improved nipper, which is illustrated below. It is manufactured under a patent dated May 10, 1886. It will be observed that the cutters are inserted in the jaws in two grooves, one cylindrical and the other oblong. Thus held, it is claimed that they are secure, and in



The Rogers Improved Cutting Nipper.

facturer's circular above referred to, the meat is delivered in small pieces, which evidently must be the case, in view of the way it is forced through the perforations and cut at the same time. The worm, it will be noticed, is large at the end coming immediately below the hopper and small toward the opposite end. The tendency is to force the meat from the hopper toward the discharge end by screw pressure, and this gives rise to the name which has been applied to the device. The knives are of such shape as to admit of ready removal and easy sharpening by means of file or whetstone.

Wood Pulp Pails.—Pails excelling in lightness, strength and durability are now made from wood pulp, converted into indurated fiber by the papier-mâché process. The method of operation is simple, and the result of extensive experiments. The wood pulp is prepared by any of the processes

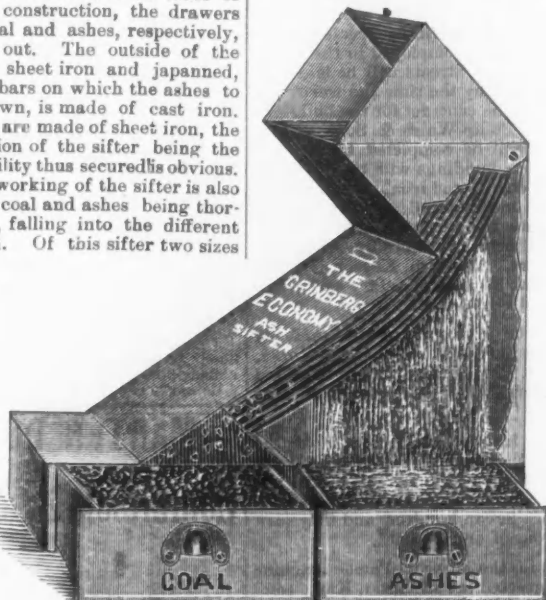
such a position that they cannot work loose in the jaws, or give the user any trouble. The point is also made that no screws or any outside fastening is required to hold them in place, while at the same time the cutters can easily be removed and a new pair inserted. The economy thus secured is an important advantage in connection with their use. The cutters are described as made of the best tool steel, and it is stated that great care is taken in tempering them so that they will bear the hardest usage without breaking. Of these nippers five sizes are made, 7½, 9, 11, 12 and 13 inches. Extra cutters are furnished at a moderate price. Information in regard to the prices is given in the Trade Report.

The Calumet Canal and Improvement Company have purchased an 8000-acre tract of land, known as the Forsythe tract, or East Chicago, on the Calumet River, near Ham-

mond, Indiana, extinguishing all conflicting interests. Marcus M. Towle, of Hammond, is president of the new company, and Gen. Joseph T. Torrence, James N. Young, Geo. W. Hoffman, and others are largely interested therein. The capital stock of the company is \$3,000,000. A railroad has been surveyed across the land, connecting the trunk lines on the lake shore with the roads at Hammond. The new company proposes to make the place a model site for manufacturing and shipping interests. It lies about twenty miles from Chicago. Work will be begun almost immediately. The conflicting interests in the land were not able to reach a satisfactory agreement until after long negotiations, which were finally closed at New York last Wednesday. Some years ago the land was sold by the Forsthes to an English company, which was not able to raise the money to make all the payments on it. Proceedings were begun to foreclose the mortgage it gave and the property has ever since been tied up in the courts.

The Grinberg Economy Ash Sifter.

The illustration given below represents this article, which is manufactured by Paul J. Grinberg, 273 Water street, New York. The cut, it will be observed, represents the sifter with one side removed in order to show the interior construction, the drawers containing the coal and ashes, respectively, being also drawn out. The outside of the sifter is made of sheet iron and japanned, and the grate or bars on which the ashes to be sifted are thrown, is made of cast iron. The drawers also are made of sheet iron, the only wooden portion of the sifter being the bottom. Its durability thus secured is obvious. The satisfactory working of the sifter is also referred to, the coal and ashes being thoroughly separated, falling into the different drawers as shown. Of this sifter two sizes



The Grinberg Economy Ash Sifter.

are made. No. 1 for family use, the height of which is 24 inches, and the length 22 inches, and No. 2, a larger size, intended for use in hotels, restaurants, &c.

Down Cast Ventilation.

For the most part the object of the sheet-metal structures that are put above flues and on the ridges of roofs are to promote an upward draft. A great many perform the work so differently that, instead of being called devices for promoting a draft, they are sometimes described as devices for preventing or obstructing the draft. Occasionally, however, there arises the need for something which shall promote a downward current. This occurs where ventilation is the prime object sought. Robert Boyle,



Down Cast Ventilator.—Fig. 1.—Style Used at the Ridge of a Roof.

a member of a well-known firm of ventilating engineers in London, has recently brought out a device of this kind, two forms of which are shown in the accompanying engraving. It is described as a down cast ventilator, and is intended to be fixed on the ridge or slope of a roof or at the eaves, for the purpose of catch-

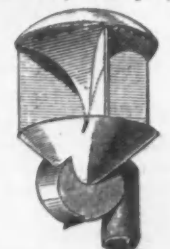


Fig. 2.—Style Used on a Slope.

ing the wind, on the principle of a wind-sail, and forcing it down a shaft into the room to be ventilated. This shaft can be built in a wall or placed against it outside or inside, as may be most convenient, the bottom of it being provided with a suitable inlet tube or bracket. From a glance at the engraving it will be seen that the ventilator catches the wind from all points, and it is so constructed as to be weather-proof. This method of admitting air is only to be employed where, owing to structural

arrangements, a supply of air cannot be got direct through the wall. Fig. 1 represents the ventilator as it would be employed on the ridge of a roof, and is somewhat architectural in character. Various designs are used, arranged to harmonize with the architectural features of a building on which it is placed. Fig. 2 shows a form that is used for fixing on the slope of a roof or at the eaves. We understand that a considerable number of these ventilators have been applied to buildings in and about London, with great success.

MANUFACTURING.**Iron and Steel.**

The Bessemer blooming and rail mills of the Pennsylvania Steel Company, at Steelton, Pa., are closed down undergoing repairs. Three thousand seven hundred and thirty-two names were on the June pay rolls of the above company.

The new plate mill of the Catasauqua Mfg. Company, at Ferndale, is being roofed and now assuming shape. An idea can now be formed of the size of the monster building. Several months must elapse before the machinery can be placed in position. The company have given the contract for the erection of 14 blocks of first-class dwellings

completed and in blast by next December. Connected with the furnace will be 44 charcoal kilns and an acetate of lime plant. The furnace will be operated under Dr. Pierce's patents, which aim to greatly reduce the cost of producing charcoal pig iron by making a commercial use of the chemical by-products obtained from the kilns, the profits from which are expected to make the charcoal a cheap fuel.—*Bulletin.*

Riter & Conley, structural iron manufacturers and builders, at Pittsburgh, have taken out a permit for the construction of a new shop. It will be located near their other works, and will occupy 80 x 100 feet on Second avenue, between Redoubt alley and Short street.

Zug & Co., proprietors of the Sable Iron and Nail Works, at Pittsburgh, are putting a new roof on their mill composed of some of the structural iron used in the Centennial Exposition building. The iron, after being taken from the Centennial building, was used in the New Orleans Exposition and brought thence to Pittsburgh. Other parts of the Centennial iron work were used in the Union Switch and Signal Company's Works on Garrison alley, the Swissvale Car Works and Graff, Bennett & Co.'s new mill at Millvale.

The Bellefonte Iron and Nail Company, of Bellefonte, Pa., were chartered on the 12th inst. with a capital stock of \$150,000.

William H. Everson & Co., proprietors of the Scottsdale Iron Works, at Scottsdale, Pa., with branch offices in the Lewis Block, Pittsburgh, made an assignment, on the 13th inst., to W. N. Smith, of the Bridgeport Lock and Safe Company, of Bridgeport, Conn. The detailed statement of assets and liabilities sent out to the creditors is as follows:

Assets.	
Mills and foundry, offices and 12 acres of land.....	\$373,727.02
Coal and appliances for delivery.....	49,378.17
Surface coal, &c., 125 acres.....	30,000.00
Calamining plant, &c.....	10,576.48
Outlying realty, Western and Forge Company.....	55,330.44
Cash on hand.....	\$682.06
Stock inventory.....	99,178.15
Accounts receivable.....	4,386.66
Accounts in litigation.....	104,628.87
Suspense account.....	3,417.75
Legacy from Everson, Macrum & Co.....	\$276.42
	6,897.24
Total.....	7,173.66
Liabilities.	
Nimick & Co.....	\$62,527.24
Nimick & Co. and banks.....	22,837.50
H. W. Macrum.....	5,080.00
Totten.....	6,364.75
Total.....	\$96,819.49
Floating debts:	
Hands' wages.....	\$19,123.47
Correct accounts.....	17,214.86
Total.....	\$36,338.33
Bills payable of which \$49,000 are secured by portion of stock on hand.....	139,431.32
Total.....	\$266,149.42
Surplus assets over liabilities.....	259,132.91
Total.....	\$524,302.39

It is reported that an arrangement will be made with the creditors, by which the works will continue in operation.

Sarah Furnace, of the Sarah Furnace Company, at Ironton, Ohio, which has been idle for some time making repairs, has been put in blast again.

Claire Furnace (Coke), at Sharpsville, Pa., which has been out of blast since the commencement of the coke strike, was blown in on the 12th inst. During the stoppage extensive repairs were made to the furnace, which will add largely to its capacity.

The rolling mill of the Kittanning Iron Company, Limited, at Kittanning, Pa., resumed operations on the 18th inst., after a stoppage of six weeks for repairs, during which time extensive repairs were made.

The blast furnace of the Reading Iron Works, at Reading, Pa., has been blown out for an indefinite period. About 75 men are thrown out of employment.

Last week an extensive strike was inaugurated by the employees of the Beach Diamond Steel Works, of Park, Beo & Co., Limited, at Pittsburgh. The mill was operated by non-union men until a few weeks ago, when an assembly of the Knights of Labor was formed, and about two-thirds of the employees joined. The leaders in the movement were discharged, and the strike followed. All departments of the works are now idle, pending a settlement of the difficulty.

Machinery.

The Loomis Gas Machinery Company have been incorporated at Philadelphia with a capital of \$500,000. H. Diston & Sons, the well-known saw manufacturers, are the principal stockholders.

The Pennsylvania Steel Company, at Steelton, Pa., made during the month of June 1005 frogs, 722 switches and 553 switch stands, besides a large number of magneto crossing signals.

The machine shop of Nailor Brothers & Allen, in Peekskill, N. Y., caught fire 17th inst., and was damaged to the extent of \$50,000.

The Reading Steam Heat and Power Company, of Reading, Pa., have been chartered. The capital is \$100,000, in shares of \$100 each, all of which have been subscribed for, 10 per cent. having been paid in as required by law prior to obtaining a charter. Among the heaviest stockholders are McIlvaine & Sons, Thomas P. Merritt, Isaac McHose, Albert Thalheimer, S. E. Ancona, John R. Miller, Levi Quier, James Nolan and J. H. Cheetham. The plant will be centrally located, and work on laying mains will be commenced at once.

Printing presses of various types are illustrated and briefly described in a neat catalogue recently sent out by the Babcock Printing Press Mfg. Company, of New London, Conn. Those interested in machinery of this kind will find the pamphlet worthy of attention.

The Buffalo Board of Water Commissioners have entered into a \$99,750 contract with the Holly Manufacturing Company, of Lockport, for a new engine. The specifica-

tions called for an engine with a capacity of 20,000,000 gallons. The Holly Company submitted three bids ranging from \$99,750 to \$94,750. The bid accepted includes an engine with six boilers and the expenses incidental to their erection. The city depends at present on three engines with capacity of 15,000,000 and one of 10,000,000 gallons.

The Arrington & Sims Engine Company, of Providence, R. I., have issued a neatly engraved notice announcing that they have purchased the Monohasset mill property, and that as soon as they can transfer their plant their facilities will be so largely increased that they will be able to meet the demand for their engines. This, we are told, they have been unable to do in their present quarters.

The J. W. Reedy Elevator Mfg. Company, 124 and 126 Indiana street, Chicago, Ill., have issued a very interesting and attractively arranged catalogue. It is devoted to steam, hydraulic and hand power passenger and freight elevators, and is profusely illustrated. There are 78 pages of text and engravings, and the descriptions are in great part carefully prepared and of practical value.

A new catalogue, bearing the date of July 1, 1887, has just been issued by the Cleveland Twist Drill Company, 24 and 26 West street, Cleveland, Ohio. It contains a large number of illustrations, price lists, tables of sizes, &c.

The Skinner Chuck Company, a corporation recently formed at New Britain, Conn., will manufacture Skinner's patent lathes and drill chucks. D. N. Camp is president; D. D. Rogers, treasurer; E. J. Skinner, secretary.

The Glen Cove Machine Company, Limited, 28-35 Clay street, Brooklyn, N. Y., have sent out a large two page circular devoted to their improved woodworking machinery. A number of engravings are given, together with explanatory remarks.

The Putnam Machine Company, Fitchburg, Mass., have erected in their yard a new iron crane, built by the Farrel Foundry and Machine Company, of Ansonia, Conn. The mast and gearing are of cast iron, the mast weighing 5 tons; the arms are of wrought iron, and the crane is capable of lifting 20 tons. Over 60 tons of granite were used in the foundation.

A new catalogue of the Cincinnati Brass Works (F. Lunkenheimer, proprietor), Cincinnati, Ohio, has come to hand. Since the issue of the preceding catalogue, in 1883, much new matter has been added and is presented, in the present edition, in an attractive form. There are 135 engravings illustrating brass goods for engine builders, gas and steam pipe fitters and others, tables of sizes and prices being added in every instance.

Messrs. Schleicher, Schumm & Co., manufacturers of the Otto gas engine, report larger sales of engines during the first six months of 1887 than at any time since the boom of 1881-82. Another feature is the demand for large engines, so that the increase is not only in number of engines but in size and power.

Dean Bros., Steam Pump Works, Indianapolis, Ind., have been very busy for several months past. Among their latest shipments were three of their largest size pumps to the Florence Coal and Coke Company, at Florence, Ala., and several to the Hamburg Distilling Co., Pekin, Ill. A large amount of new machinery has been added to their establishment in order to better facilitate the work of filling their orders promptly.

Hardware.

King's Great Western Powder Company, whose works are located at King's Mills, Warren County, Ohio, with headquarters at Cincinnati, have recently purchased some 200 acres of adjoining land to that already owned by them, upon which it is proposed to erect a number of new buildings for the manufacture of the various kinds of powder they are producers of. They are introducing, as will be seen upon reference to their advertisement on page 15, a new brand of shooting powder, the Popular Sporting, which is said to be meeting with a very satisfactory reception for the short time it has been upon the market.

A corporation for the manufacture of fire-arms, ammunition, &c., to be known as the Remington Arms Company, have been organized in Ilion, N. Y., with a capital stock of \$400,000, divided into 16,000 shares of \$25 each; 8000 shares are preferred stock, and the remainder common stock. Holders of preferred will receive 4 per cent. of the par value of each share before any dividends are paid on common stock. The trustees for the first year are John L. McMillan, Samuel T. Russell and John A. Gihlin. The company will probably purchase the Remington armory plant at the receivers' sale.

A dispatch from Findlay, Ohio, dated July 7, says: Another important contract for Findlay was closed to day. A. L. Wetherell, of Massillon, and O. C. Dewey, of Wheeling, contracted to at once begin the erection of a wire and nail factory in this city, and the ground has already been staked off for the new institution. The factory will employ over 200 men, and the proprietors promise to double the capacity of the institution within a year. They also expect to add a rolling mill of large capacity within the same time.

The Richmond Weather Strip Company, of Richmond, Ind., manufacturers of the Perfection weather strip, have succeeded in securing its adoption by the Pennsylvania Railroad Company for use on the doors of their passenger cars. This weather strip is made with a hinged apron, which is so constructed that the part back of the hinges is heavier than that in front, dropping so as to clear the carpet strip when the door is opened. When the door is closed the front edge of the apron comes in contact with a roller screwed on the door-post and is thrown down, making a close joint on the threshold by means of a cushion of rubber.

The Stover Mfg. Company, of Freeport, Ill., have just received from the California Wire Works, San Francisco, Cal., a large order for barb wire machines for manufacturing four-point barb wire, which will keep the company busy for several weeks.

Miscellaneous.

The stockholders of the Page Belting Company, of Concord, N. H., held a special meeting on the 12th inst., for the purpose of ratifying the action of the directors in the increase of the capital stock, which has been subscribed. The capital stock by this action is raised from \$200,000 to \$250,000. The directors made a brief report of the present condition of the business of the company, which was very gratifying to the stockholders.

The Age of Steel, St. Louis, says: A great many more first class molders are needed in this city. It might be well for idle molders in other cities to either visit St. Louis or put themselves in correspondence with prominent iron founders here. There is no reason for a good molder being out of work a single hour in St. Louis.

The South Baltimore Car Company have been recently organized. The capacity of the works will be from 8 to 12 freight cars per day. The location is at Curtis Bay, on a branch of the Baltimore and Ohio Railroad, about 6 miles south of Baltimore, where a large tract of land has been secured. From 50 to 100 houses will be erected, to be occupied by the men employed in the shops and their families. Streets will be laid out, paved and curbed by the time the works are in operation. The contract for the buildings has been let to Philip Walsh & Sons, of Baltimore; they will be completed by September, 1887. The buildings will be of frame, covered with corrugated iron, excepting the cupola-house and sawmill, which are of brick with slate roofs. It is expected that the works will be in operation by October or November next. Mr. Wm. Keyser is president; E. Brent Keyser, secretary and treasurer; Howard Carlton, manager.

A large force of workmen are employed rebuilding the burned Windsor Glass Works, at Homestead, Pa. The works are expected to be in operation by the middle of next month.

The Terre Haute Car Works, with the exception of the foundry department, were destroyed by fire on the 17th inst. The loss is \$100,000; insurance is between \$50,000 and \$60,000. Seven hundred and fifty men are thrown out of employment.

The plans for the Missouri Pacific machine shops to be erected at Atchison, Kan., comprise 16 large buildings, including paint shops, 65 x 200 feet; car shed, 60 x 200; woodwork shops, 100 x 100, 60 x 60 and 60 x 150; fire-proof oilhouse, 40 x 60; machine shop, 115 x 208; blacksmith shops, 80 x 120; tin shop, 24 x 80; boiler shop, 76 x 80; boiler shed, 40 x 50; brass foundry, 40 x 50; casting shed, 20 x 100; office and storeroom, 50 x 115, two stories; roundhouse, with 20 stalls, dryhouse, 30 x 30, besides several smaller buildings. The buildings alone will cost \$300,000. Grading for the shops has already commenced, and as soon as practicable the work of putting up these buildings will begin.

A dispatch from Port Huron, Mich., dated July 5, says: "Gas was struck here to-day at a depth of 200 feet. This is said to be the shallowest well in the country."

The valuation of the new buildings erected during six months of this year in Pittsburgh runs up to about \$2,000,000, against about \$2,333,000 for the 12 months of last year. At that rate buildings valued at at least \$4,000,000 will have been erected by the close of the year.

The McMillan Car Works, at Minnville, will be one of the largest in the country. The size of the car-wheel foundry building will be 85 x 221 feet. The roof will be supported by double trusses, doing away with the necessity of posts and affording more room on the floor below. The size of this building will admit of eight floors with a capacity of 200 wheels per day. The other building will be devoted to the manufacture of soft castings and will be 65 x 150 feet. A huge crane, with a diameter of 100 feet, will be placed between the two foundry buildings to hoist iron from and to the railroad tracks and buildings. Overhead tracks will be used to gather the moldings throughout the foundries and transfer to the railroad tracks. A Hamilton-Corliss engine of 500 horse power will be used for the foundries.—Kansas City Commercial.

A dispatch from Findlay, Ohio, under date of July 6, says: "The city council have authorized the issue of bonds in the sum of \$75,000, the proceeds to be applied to the purchase of the plant of the Findlay Gaslight Company. This gives the city gas trustees complete control of the natural gas business in Findlay, and was the only means that could be devised to put an end to the ruinous system of cutting which has been practiced both by the Gaslight Company and the trustees for the past year. It will require an appropriation of at least \$25,000 more to take up the mains that form a duplicate system in the business portion of the city, and relay them in the suburbs, which, with the money already invested in the city works, will make the total cost of Findlay's natural gas plant about \$175,000."

Messrs. Felton, Rau & Sibley, paint and varnish manufacturers, 136-140 North Fourth street, Philadelphia, Pa., have issued a circular directing special attention to their paint for iron and machinery. They announce, among other things, that they are now better than ever prepared to fill their orders promptly, having recently enlarged their factory and equipped it with improved machinery for manufacturing and grinding all kinds of paints and paint fillers.

Wm. R. Butler and James N. Hersh have formed the Hersh Furnace Company, to continue the manufacture of the Hersh Heating Furnace, which for the past five years has been made at Allentown, Pa. They have erected a substantial brick factory at Lehigh, Pa., 40 x 85, two stories and basement, with a blacksmith shop, 14 x 21 feet.

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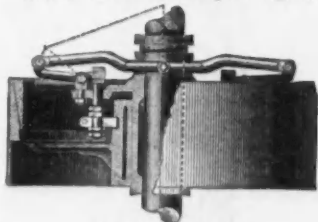
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Also Hand Farm Tools. Send for Price List.

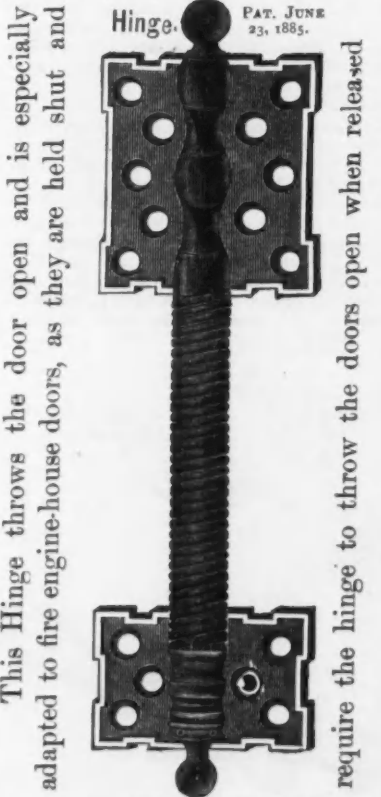
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MILWAUKEE, WIS.**

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Patent Adjustable Wings. Capacity quickly increased or diminished. Self-Adjusting Bearings. Light running, durable.
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Write for our new Illustrated Catalogue, embracing our full line of Bolts, Axle, Spring-bar and Saddle Clips, Shaft Couplings, Pole Eyes, King Bolts, Nuts and Carriage Forgings.
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N. B.—By Act of the Legislature, the name of the Ayres Mfg. Co. was changed to The Hamblin and Russell Mfg. Co.

INTERCHANGEABLE LOCK-CORNER SHELF BOXES. Screw Cases, &c., FOR THE HARDWARE TRADE.
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PATENT DRAW KNIFE CHAMFERER.

Can set the adjusting screw to the width of chamfer wanted. For sale by the jobbing and retail hardware dealers.

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TOOL MANUFACTURERS.

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The best selling fastener made. Also a full line of brass and nickel-plated Refrigerator Hinges at lowest prices. For sale by leading jobbers throughout the United States.
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The Recent Boiler Explosions on English Torpedo Boats.

Regarding the recent disastrous torpedo-boat boiler explosions in England some particulars have been made public which will be read with much interest. The British Admiralty, it appears, determined to test a flotilla of torpedo boats purchased for the navy at various times. The test was different from anything made before. Hitherto boats have been tried as weapons of attack and defense. Their sea-going qualities up to a certain point have been made the subject of experiment, but nothing was really known concerning their powers of endurance when steaming at full speed in charge of naval engineers. It is obvious that in case of actual war torpedo boats might be called on to steam long distances in order to repel a threatened attack, and it is also clear that under such circumstances they would be called upon to go from place to place as fast as they could go. It was decided for these reasons that the boats of the flotilla should race over a distance of about 100 miles. The results of the trial are thus reviewed in the *London Engineer*, to whom also we are indebted for the annexed engravings:

Opinions differ as to the value of torpedo boats, but it is certain that no maritime power could be without them, and the fact that out of 24 British boats no fewer than eight were rendered *hors de combat* as soon as they were worked under conditions which might, and probably would, obtain any or every day if we were at war, is extremely serious. The failures we have recorded possess a national importance. It is a noteworthy fact that all the boats which broke down were by the same firm. There were four boats by Messrs. Yarrow & Co., three boats by White, of Cowes, the remaining 17 were by Thornycroft. If we refuse to class the failure of a propeller as a breakdown because the boat was still able to proceed, though at reduced speed, we find that the casualties to the boats of the Chiswick firm came to over 41 per cent. If out of 100 torpedo boats 41 are to become unserviceable within an hour after they proceed to sea, confidence in the utility of such craft will be weakened. It may be urged, and has already been urged to some purpose, that the failures were due to the incompetence of the men in charge. If this were wholly true it would imply a very serious indictment of the Admiralty; we refuse, however, to believe it. While we admit that had more care been exercised in the stokeholes it is possible that no breakdown would have occurred, we hold that any system of design or construction which renders boilers and engines dependent for their safe working on exceptional skill and vigilance must be defective. Whatever the probable shortcomings of the crews in charge could possibly have been, we think the main cause of the failures must be sought and found in the machinery of the boats, and even in the boats themselves, and we fancy, before we have done, that our readers will be of the same opinion. As we know nothing yet of the nature of the failures which took place in the engine or boiler-rooms of Nos. 27, 41, 50, 42 and 55, we can say little about them. No. 27 had hot bearings; but they must have been very hot indeed to stop the boat. The bearings in a torpedo-boat engine are so comparatively small and light, and the appliances for cooling so perfect, that, as is known from experience, a very hot bearing can be cooled in a very few minutes; and, in a long race, such as this under consideration, five minutes' delay at the outset could not destroy the chances of a boat. Putting this on one side, however, we may confine ourselves to two casualties—namely, the failure of the boilers in No. 47 and No. 57. In both cases the crowns of the fire-boxes came down. In No. 47 the failure was sudden and complete; and, as we know, lives were lost. In the case of No. 57 the failure of the crown plate was not so sudden and complete, and no lives were lost; although the risk incurred was awful. Why did the furnace crowns come down? The first reply that will suggest itself to an engineer is that they came down because the boilers were short of water. On this point, however, there is a great deal to be said; and, in order that our readers may comprehend the whole matter, we give here two sets of drawings—Figs. 1, 2 and 3, showing the system of construction adopted by Messrs. Yarrow & Co., and Figs. 5, 6 and 7, that used by Messrs. Thornycroft & Co.

At first sight there does not seem to be much difference between them, but there is a difference—a most essential difference in detail. It will be seen that in neither boiler are bridge stays used. The tops of the inside and outside fire-boxes are secured to each other by stays. It will also be seen by Fig. 8 that the stays used by Messrs. Yarrow have large heads jumped up out of the solid and forged to shape; that under these heads is a screw thread; that the opposite ends or points are also screwed. The stays are turned down between the threads, so that the threads stand up. These bolts are then screwed hard into place from the inside, and large square nuts are then screwed on the ends projecting on top of the fire-box shell. In locomotive work the crown stay bolts always have heads or nuts inside the fire-box on the crown stays.

Turning now to Mr. Thornycroft's boiler, it will be seen by Fig. 4 that he dispenses with nuts and heads. His stays are screwed, just as Mr. Yarrow's are, but there the resemblance ceases. The ends of the stays are riveted over—the crown stays thus resembling the side stays. This we regard as an essentially weak system of construction, and to it we believe the failure of the boilers in 47 and 57 was partly due. The system of riveting over cold answers well enough in a side stay which is not more than 6 inches or 7 inches long over all; but riveting up cold has a very great tendency to do more harm to the screw-thread in the $\frac{1}{2}$ -inch crown-plate than anything else, for it is next to impossible properly to hold up a bar 2 feet long to the riveting hammer. It may be urged that a screwed and riveted stay is just as strong as a screwed stay with head and nut. This we deny. That it may be quite strong enough under ordinary circumstances is one thing; that it is strong enough for

torpedo-boat boilers does not at all follow as a legitimate consequence.

It will not do to assume that, because such a system of construction may give good results in a locomotive boiler, it must do so in a torpedo-boat boiler. It has been urged that the crown plates came down in Nos. 47 and 57 because the plates were overheated from shortness of water. This we concede at once, but it does not follow that the men in charge were to blame. As a matter of fact, the crowns of the fire-boxes in torpedo boats are often left uncovered by water for some little time. When running before a

taken place, and that the old Lightning has given no trouble and has been very hard worked. But the Lightning has been managed by men of great experience.

We have little doubt that Messrs. Thornycroft's other failures have been due to the desire to make the machinery of their boats as light as possible. It is a matter of interest to know that the Yarrow boats of the same dimensions weigh nearly seven tons more than the Thornycroft boats. Of this $3\frac{1}{2}$ tons go to the hull and $3\frac{1}{2}$ tons to the engines and boiler. For example, it will be seen by Fig. 1 that Messrs. Yarrow & Co.

Maritimo gives a list of the following tonnage taken up for the United States: Azalea, 2200 tons; Royal Prince, 2000; Beaconfield, 2000; Lemuria, 2000; J. M. Lockwood, 1900; Kate Fawcett, 1800 tons.

NEW PUBLICATIONS.

THE MAVERICK NATIONAL BANK MANUAL, BOSTON, July, 1887.

The Maverick National Bank, one of Boston's famous institutions, has recently published a manual designed to furnish to its

paid \$8,000,000 premium in redeeming \$3,000,000 in debt. Since the war the Government has had \$2,500,000,000 of debt to readjust, and in refunding this debt it has been able to so arrange it as to pay a large proportion of it at will. Now arises the question of paying the last billion of the debt one-quarter of which running at 4½ per cent., falls due in 1891, and three-quarters of which, running at 4 per cent., does not fall within Government control as to payment until 1907. We speak of the debt of the United States as, in round numbers, \$1,000,000,000; but is this really all? Does not the Government owe the interest as well as the principal? The Government is not a trading or mercantile institution. It has not even the advantage of an investor, who, with a loan running at a low rate of interest, and on long time, can take advantage of a higher outside rate to make temporary profitable investments. Here is really what the Government owes:

Rate.	Principal.	Years to run.	Interest to Red'pt'n.
4½ per cents.	\$250,000,000	4	\$45,000,000
4 per cents.	750,000,000	20	300,000,000
Totals.	\$988,000,000		\$635,000,000
Principal owed.			\$988,000,000
Interest to accrue.			635,000,000
Total to pay.			\$1,623,000,000

It will readily be seen from this table that the main problem lies in the \$738,000,000 of four per cent. bonds which have 20 years to run, and upon which the Government is under contract to pay \$590,000,000 of interest, or 80 per cent. upon each bond. Elsewhere in this volume we present for a series of years full statistics of the Government surplus, its revenues, appropriations, and expenditures, and from these it may be seen that the Government surplus averages \$101,000,000 a year. In the last seven years it was \$707,000,000. A surplus of about \$100,000,000 must accumulate each year under existing laws. This is more than one-tenth of all the money in the hands of the people. Congress has provided for a sinking fund, in which about \$50,000,000 of this surplus must be invested by purchase of bonds. Future reductions in revenue may reduce the other half of the surplus, but so long as it accumulates it must be put back into the channels of business; and there are only three ways for this: Distribution by gift, distribution through Government works, or distribution by payment of the debt before maturity. Our policy is, and will continue to be, pay the debt.

The body of the work contains historical sketches of the public national debt of the United States. It deals with the credits of foreign nations, with States and municipal indebtedness, the value of water work bonds for investment purposes, an historical review of banks and banking in the United States and elsewhere, a chapter on coinage and currency, on bank clearing houses, railroads, foreign exchange and commerce, navigation, land and agriculture, coal and iron, recent electrical development from a financial point of view, local statistics and miscellaneous data, including copper and petroleum statistics. The manual will be found a useful document for reference.

Steel Cut Nails versus Wire Nails

In illustration of the fierce competition now being carried on between cut nails and wire nails we have received an account of a test recently made by the Bellaire Nail Works, of Bellaire, Ohio. The company procured from the manufacturer a keg each of the following sizes of wire nails: 20d., 10d., 6d. and 4d. The number of these wire nails in a pound as advertised, and as found by actual count, and also the number to the pound of the cut nails that were used, is shown in the following table:

Size.	Advertised number wire nails.	Actual number wire nails.	Cut nails.
20d.	34	34	23
10d.	66	64	58
6d.	132	124	88
4d.	262	230	168
	432	320	288

The plan of testing was to drive the nail into a dry pine scantling to within a quarter of an inch of the head and hang weights on the head until the nail pulled out. The following is the holding power of nails thus tested:

Size.	Cut Nails. Pounds.	Wire Nails. Pounds.
20d.	1009	485
10d.	591	247
6d.	303	209
4d.	345	177
	209	106

It will be seen from this table that one pound of cut nails has a holding power as compared with 1 pound of wire nails as follows:

1 lb. 20d. Cut Nails equals 1.40 lb. Wire Nails.
1 " 10d. " " 1.65 " "
1 " 6d. " " 1.70 " "
1 " 4d. " " 1.59 " "
1 " 4d. " " 1.77 " "

It will be interesting to see what answer the wire nail manufacturers will make to this statement, which is on its face a very strong argument in favor of the cut nail, both as to quantity per pound (difference in price considered), and as to actual holding power.

The Belgian *Moniteur des Interets Materiels* asserts that the German Association of Steel Rail Producers are desirous of buying off the competition of the Belgian firm of Cockerill & Co. from the German market, by granting the latter 10¢ per ton on all rails for which tenders are advertised in Germany. It is pointed out that by this means a much greater profit might accrue to German producers than at present; about 10,000 tons per month of steel rails have to be tendered for in Germany, and the average price is 105m. to 110m., which might be raised to 125m. or 130m., if the competition of Cockerill & Co. were bought off. The Belgian paper describes this proposed arrangement as the climax of the protective system's advantages, but it is scarcely possible to believe that the statement is seriously meant. The Société Cockerill is, of course, the principal foreign competitor that the German steel works have to encounter in their own markets, but if prices of rails were raised in Germany by 20m. per ton other Belgian and some English producers would also require to be bought out.

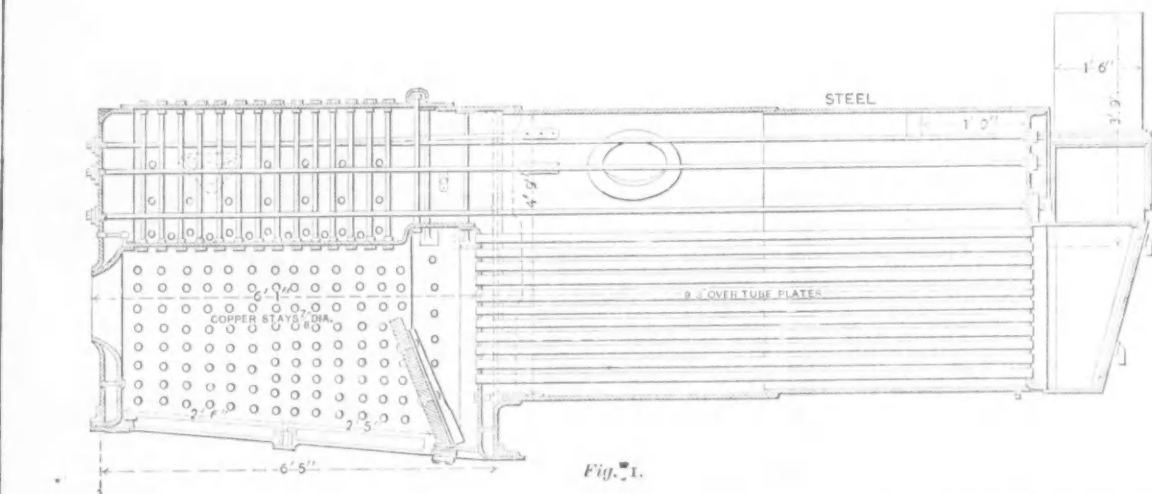


Fig. 1.

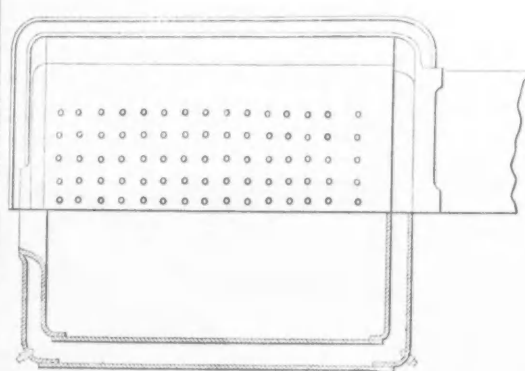


Fig. 3.



Fig. 8.

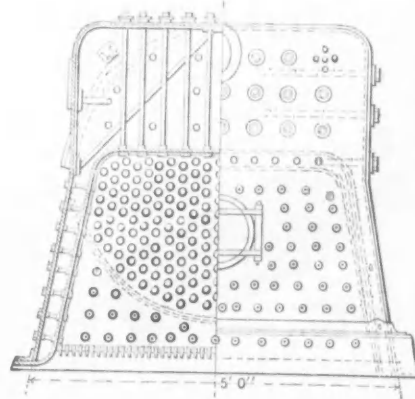


Fig. 2.

THE YARROW BOILER.

sea, the boat will get on the back of a wave traveling at nearly her own pace, and she will run with her head down and her stern up until she has outpaced the wave. During this time the crown of the fire-box may have no "solid water" on it; but besides this, torpedo boats are so lively and jump about so much that in a heavy sea the crown plates are sure every now and then to get left dry, or nearly so, for a few seconds, unless the water is kept high in the glass. If there are large nuts inside the box, these serve to keep cool considerable areas of metal just round the screw

raise the forward end of the internal fire-box. They thus get room for more tubes without raising the crown plate as a whole. The small portion actually raised being near the mid-length of the boiler, where the water-level is not much effected by pitching, it is always covered. But the result of adopting this system of construction is that the boiler holds an extra half-ton of water.

A very important sale has been reported in the Bilbao market. One of the first houses in the iron ore trade have purchased

customers a variety of statistical and other information likely to be of use to them. An introductory chapter entitled "The Outlook" contains much that will be worth reading as indicating the position which our great financial interests are taking upon one of the most important problems now before us for solution. We quote from this chapter as below: "The tenor of the Administration and of public sentiment is to legitimately restrict the operations of the Government, to involve it in no new or hazardous enterprises calling for public funds; to maintain peace with all nations, relying upon the spirit of patriotism

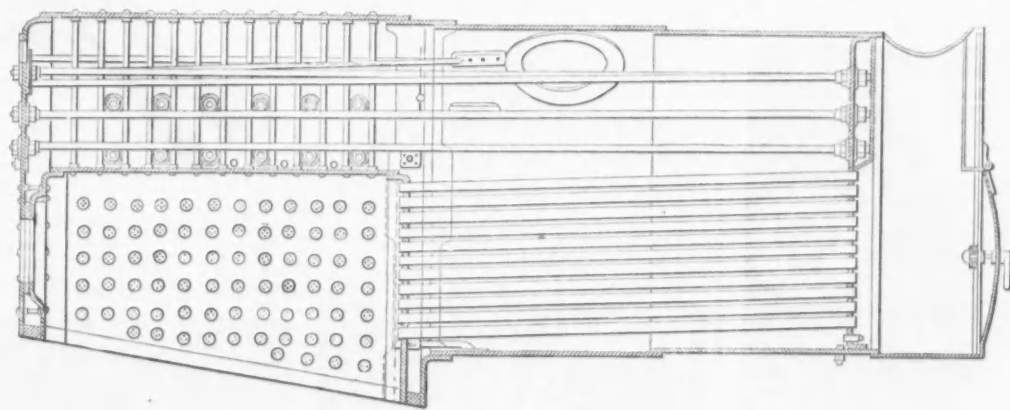


Fig. 5.

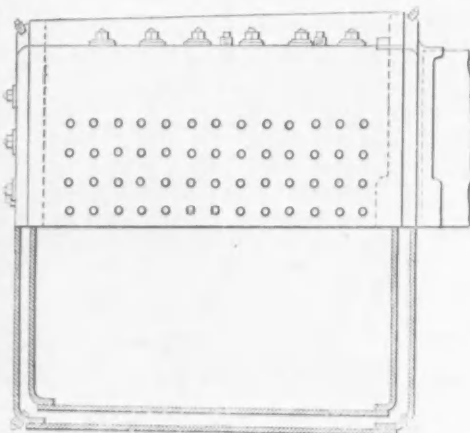


Fig. 7.



Fig. 4.

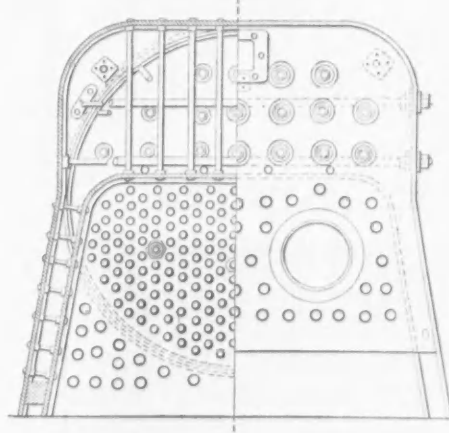


Fig. 6.

THE THORNYCROFT BOILER.

threads. It is well known that it is practically impossible to make a nut red hot if the stay remains cool, because the stay serves to convey away heat in a way very clearly set forth by Peckel, Wye, Williams and others. Every engineer will concede, we think, that if the top of a Yarrow box became overheated it would be likely to come down between the stays in pockets, but it is evident that it must be made very hot indeed before the heads could be forced off the stays or drawn right through the plate. It is, we think, incontestable that the Yarrow system must be stronger than the Thornycroft system. A leak might be started by the crown plate cracking, but its total disruption is to the last degree unlikely. It must not be forgotten, however, that these are the first failures of Thornycroft boilers that have

from a leading iron ore company 300,000 tons of Rubio at the extremely low price of 6/3. This purchase is considered to be a very favorable one for the firm concerned, but the recent disagreeable experience of some of the Bilbao miners in dealing with weak buyers has led to the company in question taking a low price for the large line to secure the advantage of an absolutely guaranteed contract. On the other hand, odd cargoes have been sold at 6/6, 6/7½ and 6/9 for superior Rubio, and 6/10 and 7/2 for Campanil. All these sales, as well as the 6/3 sale, are without guarantee or scale. The first of the ships for the United States has arrived, and it is interesting to note that this ship—the Obock—is the largest which has ever entered into the port, her net tonnage being 1977 tons. The Bilbao

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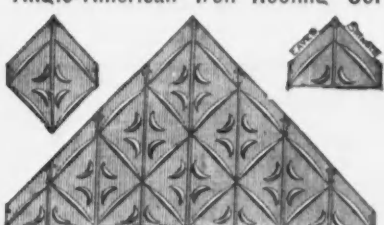
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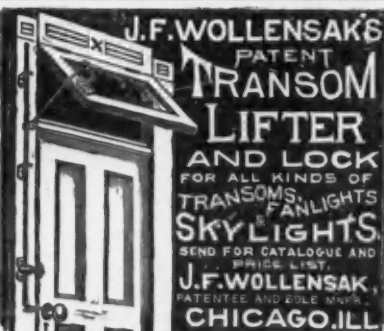
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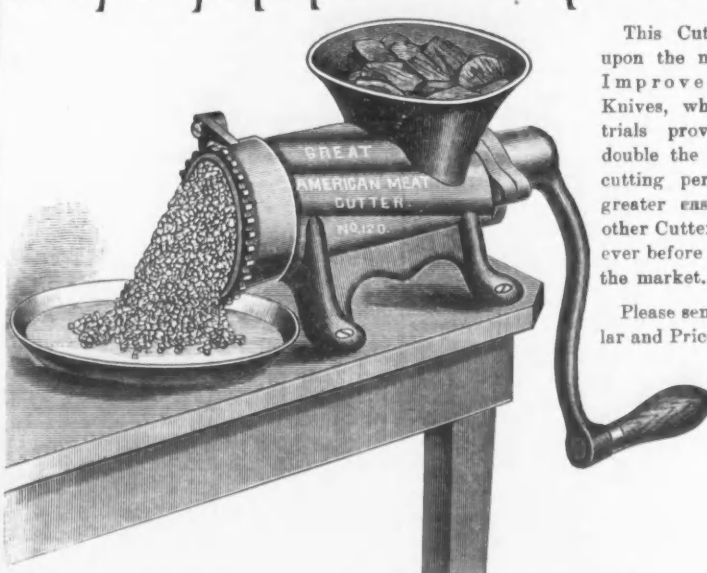
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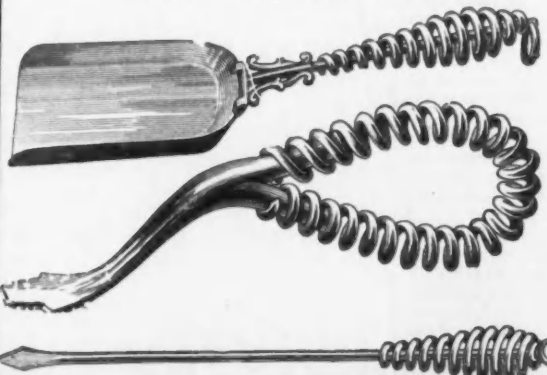
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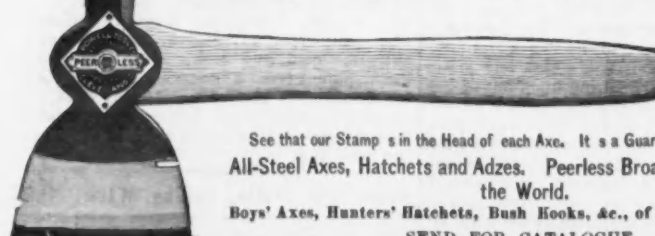
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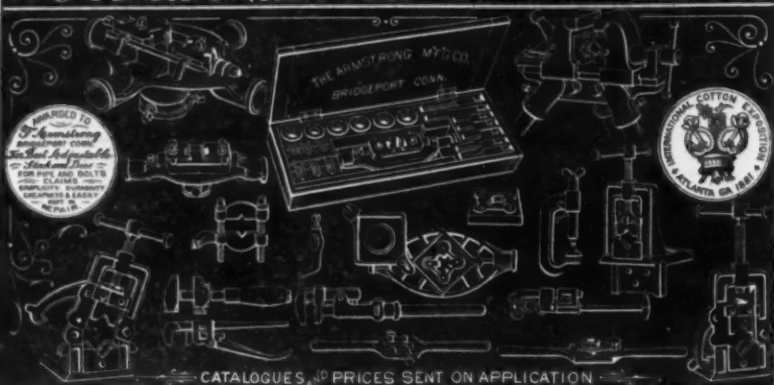


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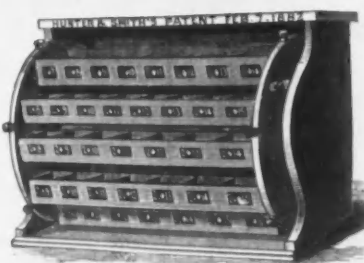
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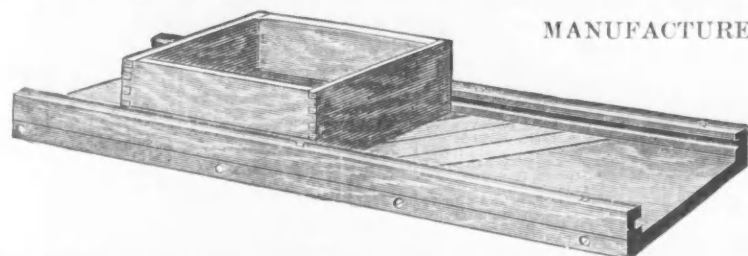
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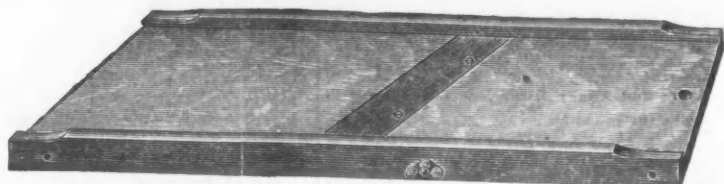
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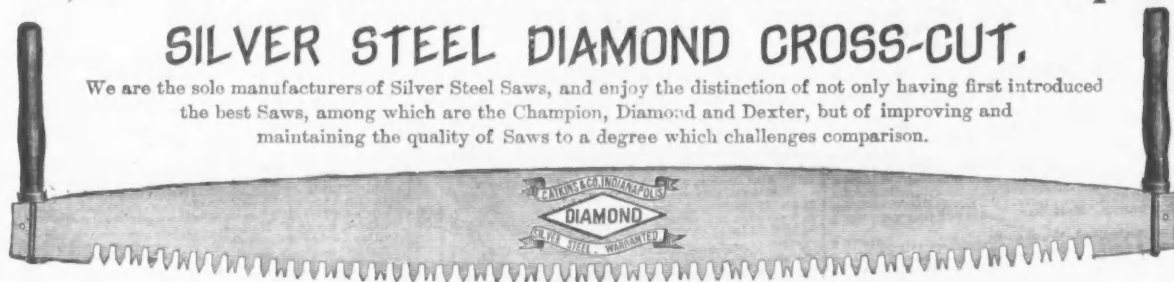
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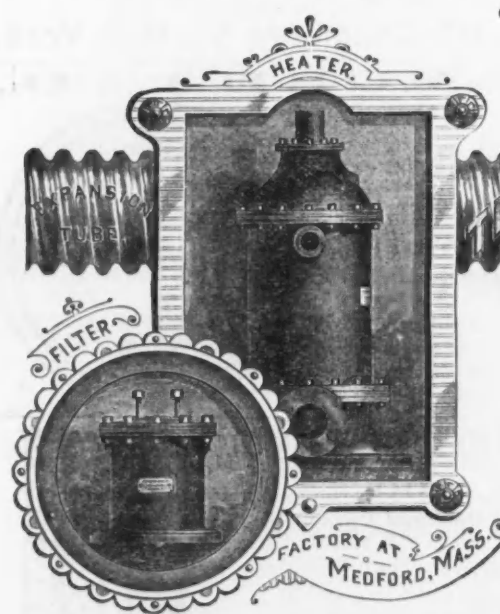
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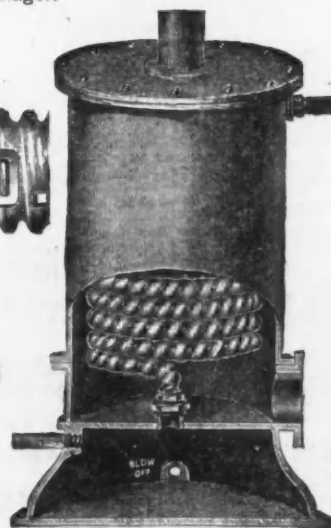
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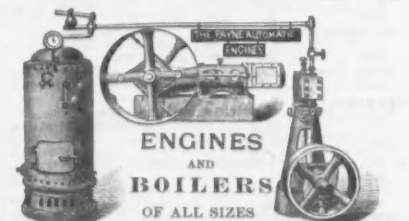
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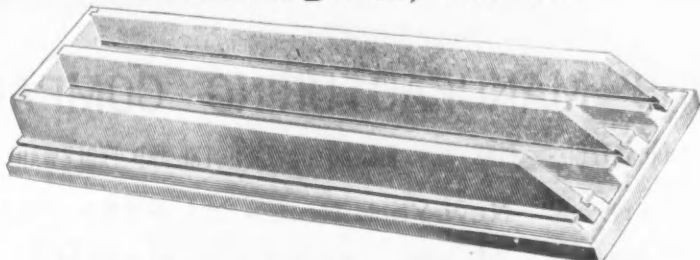
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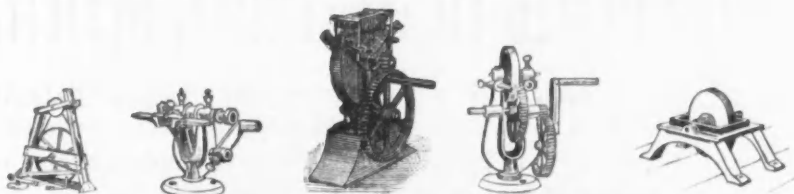
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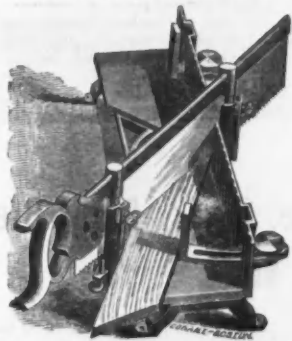
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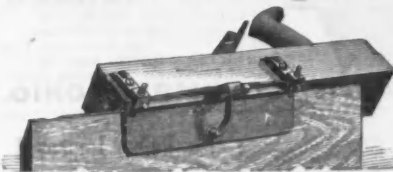
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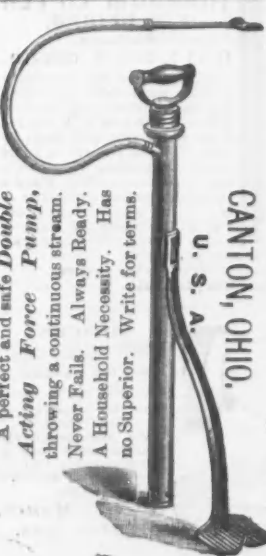


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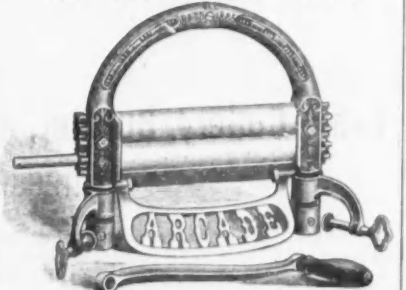
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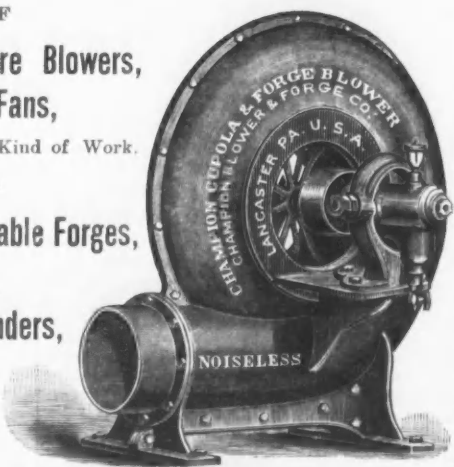
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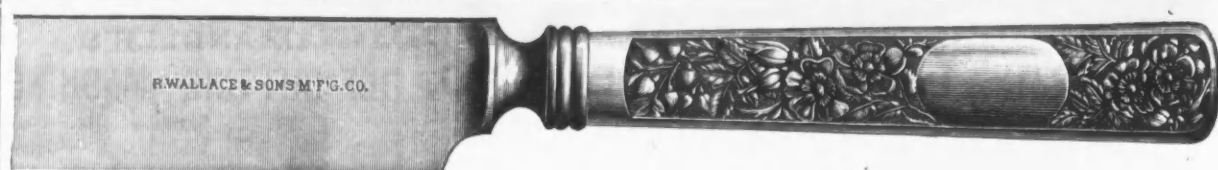
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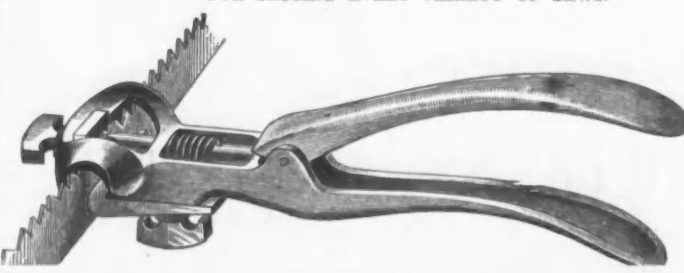
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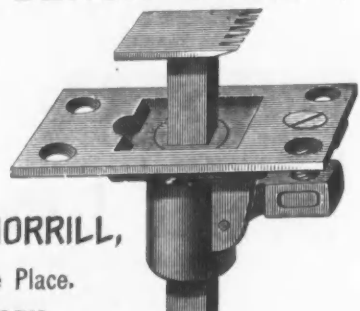
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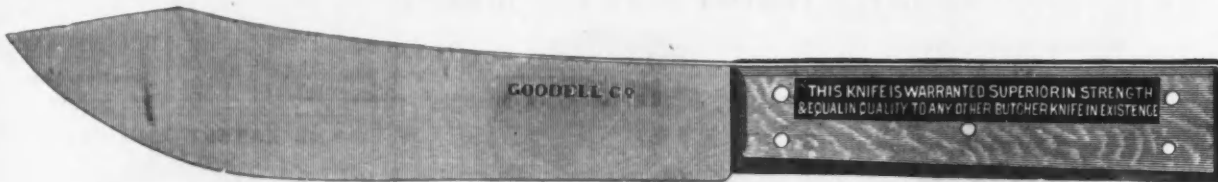
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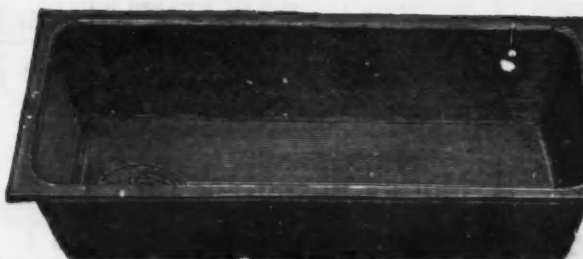
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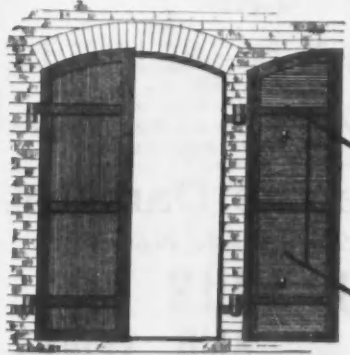
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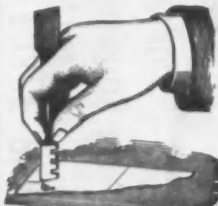
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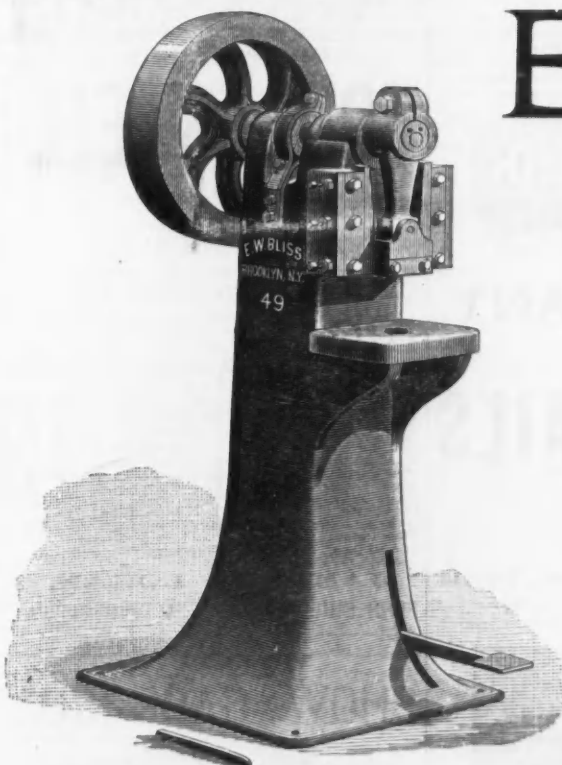
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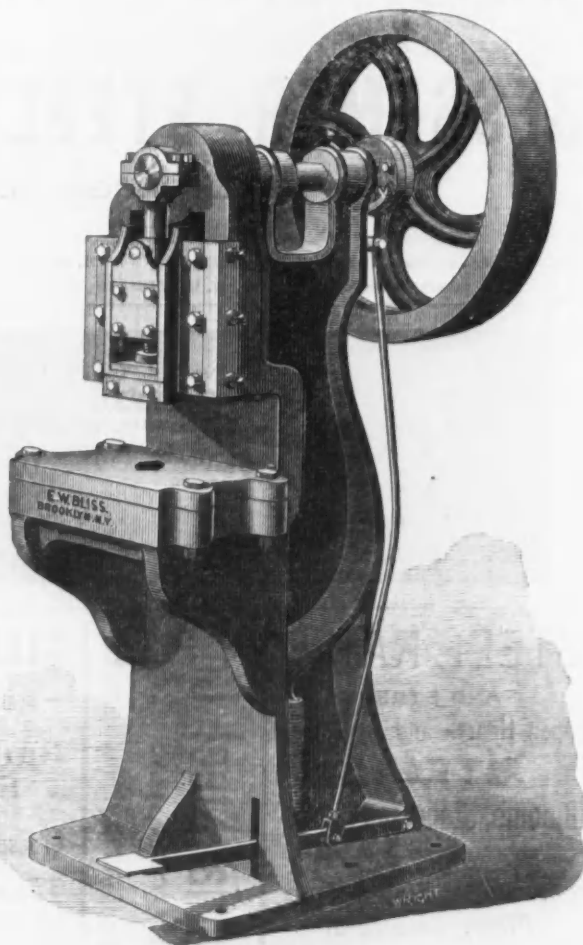


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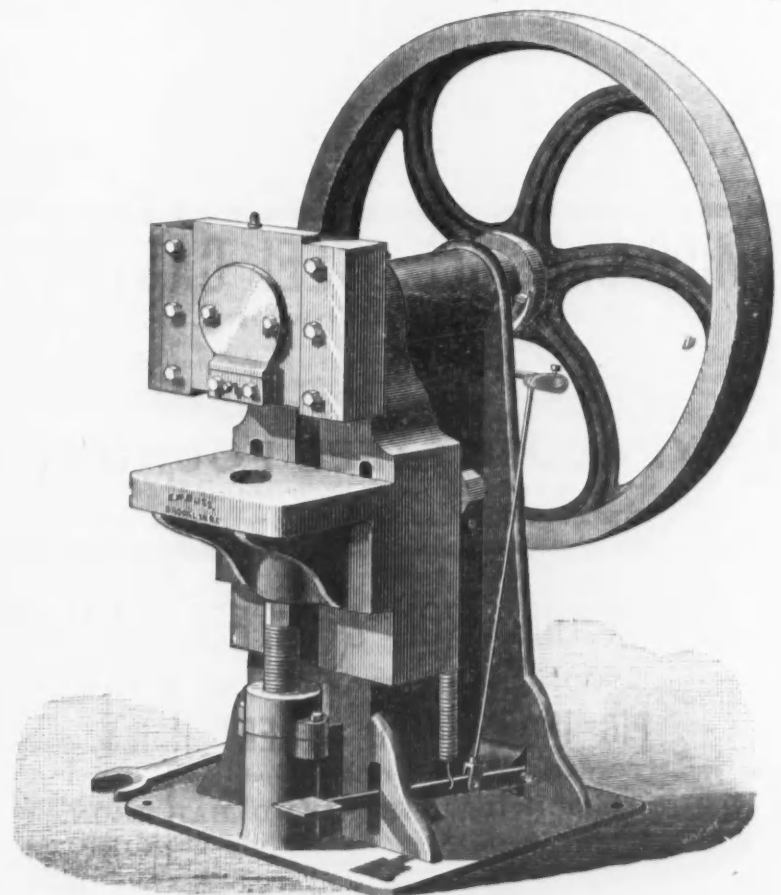
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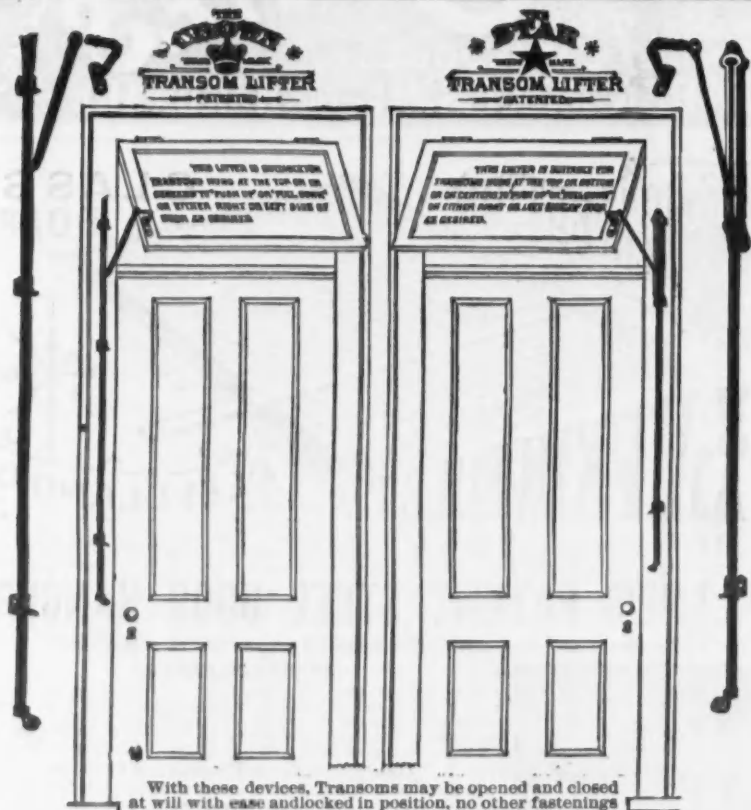
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With these devices, Transoms may be opened and closed
 at will with ease and locked in position, no other fastenings
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 We are now prepared to fill orders for the "Crown" and "Star" Lifters, in such
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44	4 "	" "	" "	0.65		84	4 "	" "	" "	0.80	
45	5 "	" "	" "	0.75		85	5 "	" "	" "	0.90	
46	6 "	" "	Nickel Plated,	1.75		86	6 "	" "	Nickel Plated,	2.00	
47	7 "	" "	" "	2.00		87	7 "	" "	" "	2.25	
48	8 "	" "	" "	2.25		88	8 "	" "	" "	2.50	
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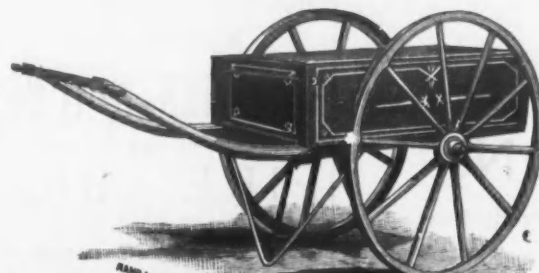
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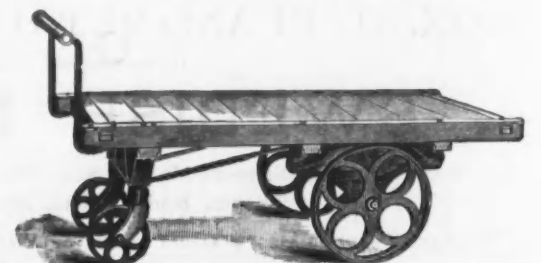
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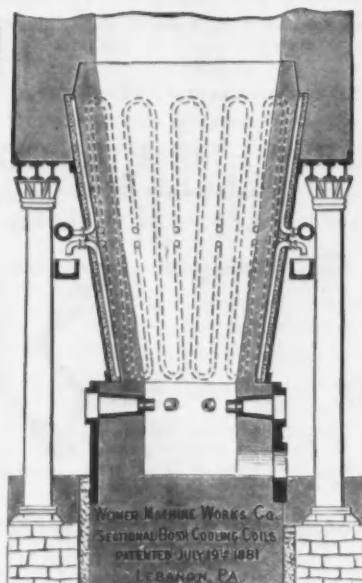
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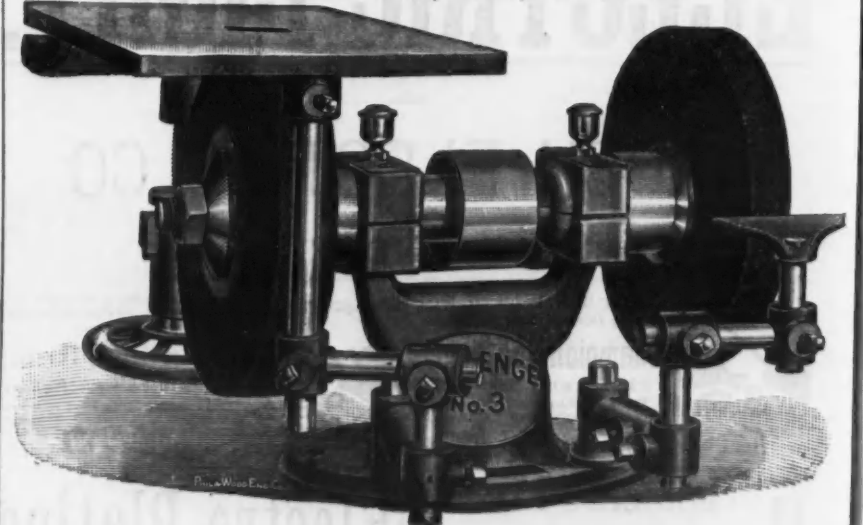


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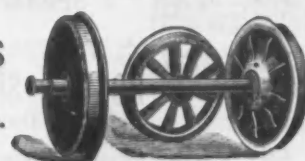
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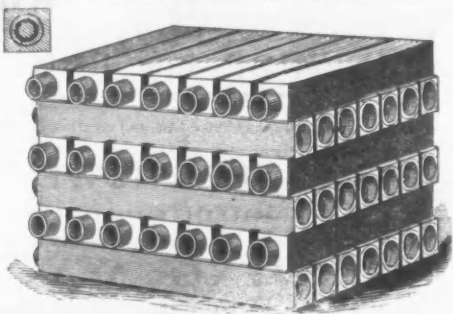
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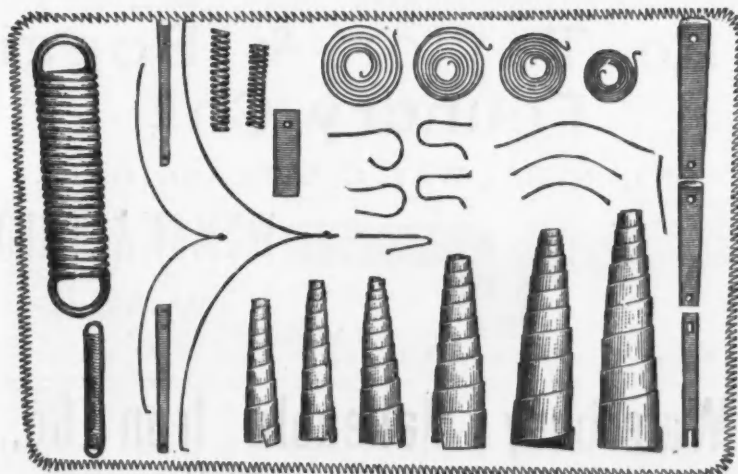
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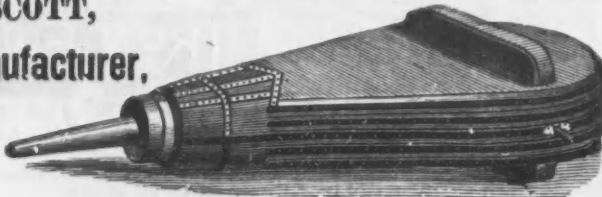
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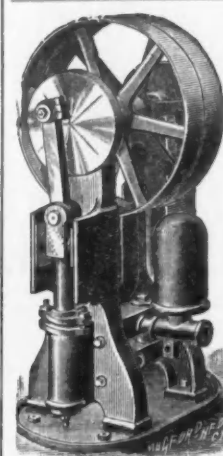
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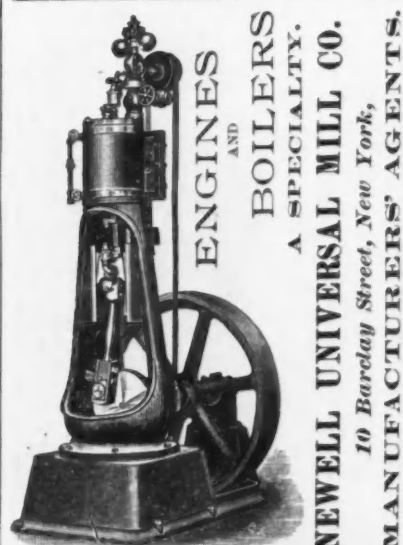
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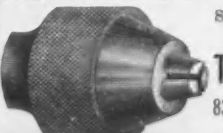
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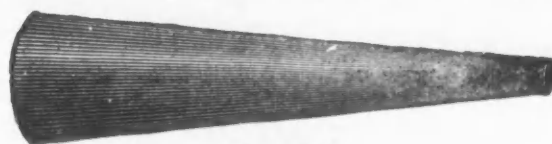
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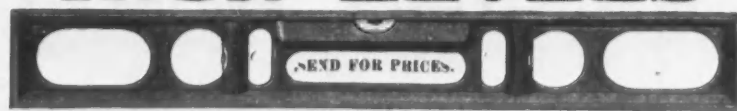
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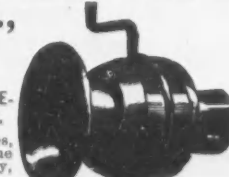
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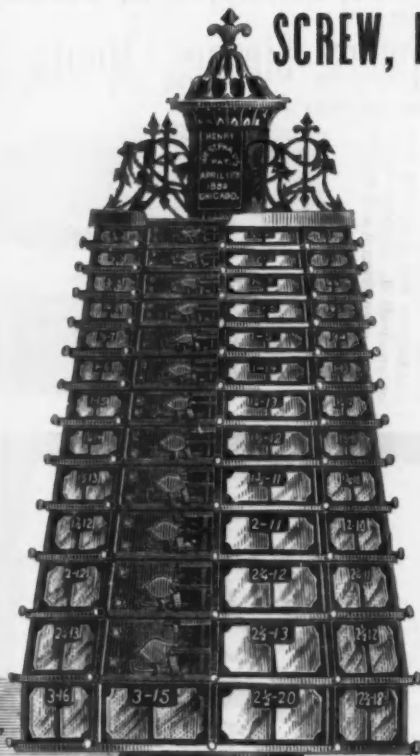
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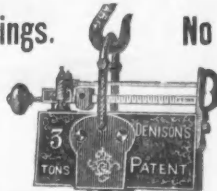


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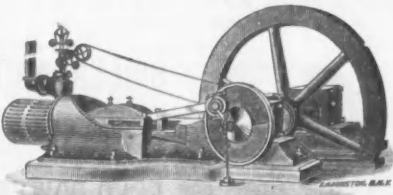


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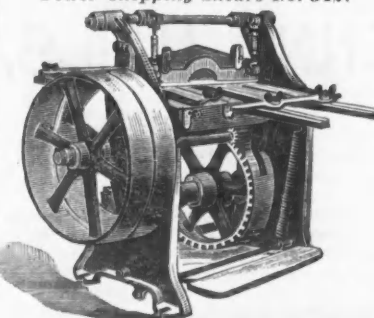


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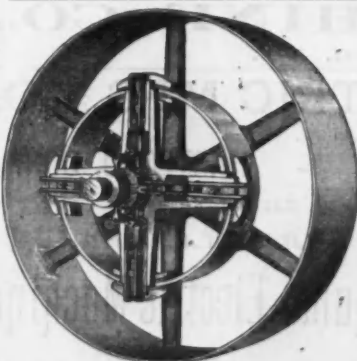
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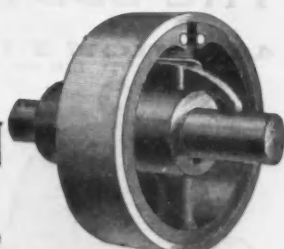
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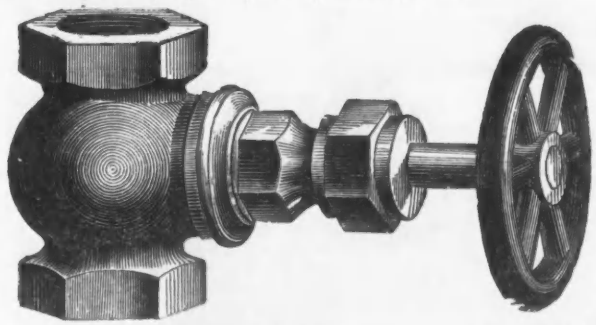
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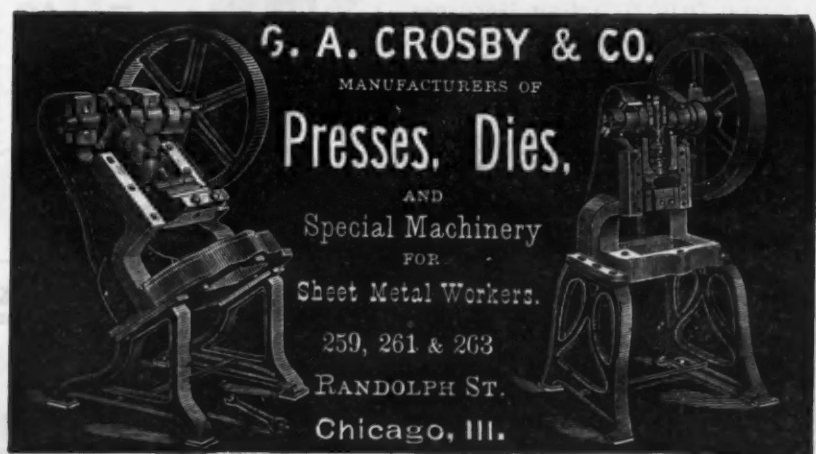
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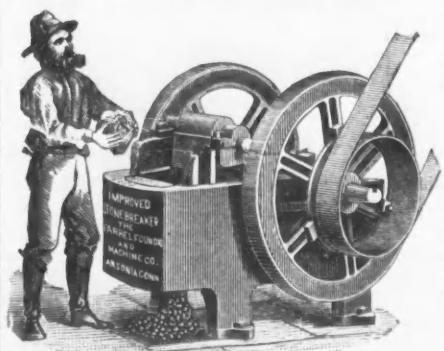
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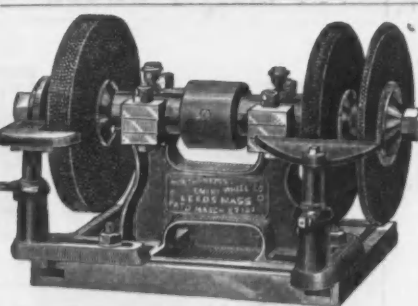
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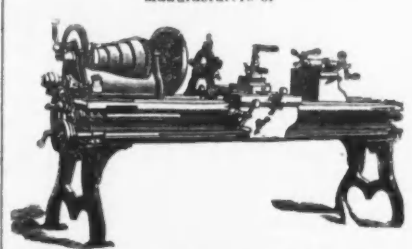
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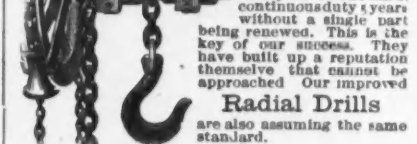
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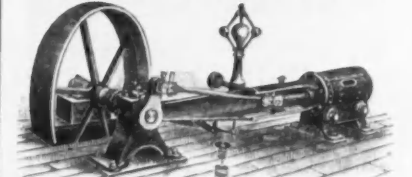
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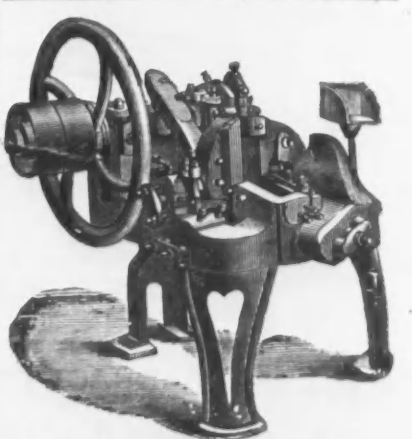
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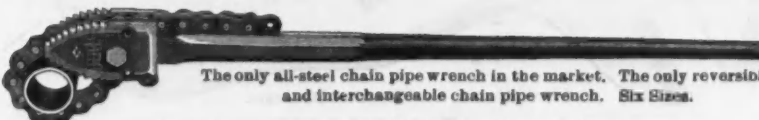
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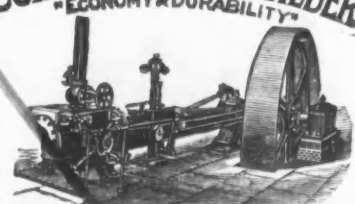
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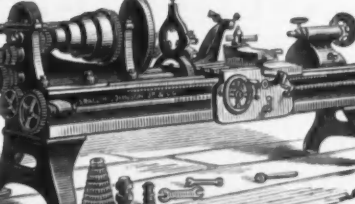
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